ARCHIVES OF OPHTHALMOLOGY.

HYPEROSTOSIS CRANII, WITH THE REPORT OF A CASE LEADING TO EXOPHTHALMUS AND BLINDNESS.

By Dr. F. W. ELLIS, Monson, Mass.

(*With three photographs on Text-Plate X.*)

DIFFUSE hyperostosis of the bones of the head is a rare disease, very liable to implicate the visual organs, which has been hitherto ignored in ophthalmological literature. To guard against errors in diagnosis, the existence of such a disease should certainly be known to the oculist. The affection is so rare, or has been so seldom recognized, that the publication of every case presenting well marked features is desirable. It is probably more common than the small number of reported cases would seem to indicate. It is very likely that, in some instances, it has been mistaken for a new growth in the cranial sinuses.

Exact clinical study of the disease is recent, but its existence has been known for at least two centuries. Malpighi described an enormously hypertrophied skull in 1697. A number of remarkable crania enlarged by hyperostosis are preserved in various museums of Europe and America, but in many instances without any history.

Virchow was probably the first to make a systematic study of the subject. He gave a very good account of the disease in his work on tumors, and applied to it the name leontiasis ossea. He regarded the pathological process as a local irritation and inflammation.

Knowledge of the affection was considerably extended in 1892 by the independent publication in Paris of theses by Baumgarten[1] and Millat,[2] both of whom regarded it as an

[1] La leontiasis ossea (hyperostose des os de la tête).
[2] De la leontiasis ossea, hyperostose diffuse des maxillaires supérieurs et du crâne.

independent affection distinct from acromegaly, ostitis deformans, and other pathological conditions attended with enlargement of bones.

Quite a number of the clinical studies of the disease have been made in the United States. The first American paper describing a case of the obscure malady was by Starr.[1] Dr. Starr regarded his case as one of an undescribed disease related to acromegaly, and gave to it the name megalocephalie. A little later Putnam[2] published a paper of great excellence, in which he described four new cases, to which was appended the account of a fifth by Prince. Accompanying this article was another by Edes describing a sixth case.

A very recent and satisfactory, though brief, account of hyperostosis, to which my attention was kindly drawn by Prof. Putnam, is given by Sternberg[3] in Nothnagel's *Specielle Pathologie und Therapie.*

Hyperostosis of the bones of the head occurs under two forms: diffuse hyperostosis, which is the principal subject of this paper, and a form in which the intensity of the pathological process is more localized, and there is a tendency to the formation of tumor-like enlargements. Errors of diagnosis are less liable to occur in cases belonging to the second division. A considerable number of cases of this character have been observed. This variety of hyperostosis affects particularly the jaws, and begins with a circumscribed tumor, accompanied by a diffuse hyperostosis of surrounding parts. The orbit is likely to become involved, in the later stages of the disease. The bony enlargements may attain enormous size, producing horrible deformity. The extension of the disease may produce occlusion of the nose, epiphora, exophthalmus, and compression of the brain and nerves. A case often quoted is that of Forcade, reported in 1734. The son of this surgeon had a lacrymal abscess following an attack of small-pox. A bony growth appeared in the nasal process after the abscess, and extended to the jaws, orbits, and contiguous parts. There were extensive exostoses, marked ex-

[1] *American Journal of the Medical Sciences*, Dec., 1894.
[2] *American Journal of the Medical Sciences*, July, 1896.
[3] *Vegetationsstörungen und Systemerkrankungen der Knochen.*

ophthalmus, and difficulty of speech. An interesting point in this case is that it was supposed to have originated in suppuration of the lacrymal sac. In this connection a case described by Heath,[1] is worthy of note. The patient apparently suffered from double lacrymal abscesses. Hyperostosis followed, which implicated the orbit, pushing the eyes forward. The eyes were subsequently lost; one by inflammation, and the other from a blow. Cases of this character are of importance from an etiological standpoint; especially, as some cases of the diffuse variety of hyperostosis have been ascribed to erysipelas and injury. The etiology of hyperostosis, so far as it is known, lends some support to Virchow's inflammatory theory. It must not be forgotten, however, that lacrymal abscesses may result from hyperostosis. My own patient has had several. It is possible, as has been suggested, that in cases which seem to have originated in inflammation of the lacrymal sac a reversed sequence is the true one. It is conceivable that the abscesses may have been due to stenosis of the lacrymal duct from unnoticed hyperostosis. It is a matter of great importance to determine whether this formidable disease can be caused by lacrymal inflammation, and it is to be hoped that future observations will decide the question.

The diffuse form of hyperostosis, to which we wish to direct our attention particularly, is exceedingly rare, or cases of this variety have been seldom recognized. Only about a dozen cases observed in life have been reported, and nearly one half of these have been described in this country. The beginning of the disease is insidious and generally unnoticed. The larger number of reported cases have begun in childhood or youth. A congenital case is on record. A minority of cases originate later in life, and to this number my own belongs. The duration of the disease is very long, and may extend to twenty or thirty years.

The earliest subjective symptom is generally headache; the later symptoms are mostly explained by pressure on contiguous parts by the hypertrophied bone, the diminution of cavities, and the stenosis of canals. Such symptoms are

[1] Garretson's *System of Oral Surgery*, 3d edition, p. 824.

occlusion of the nasal passages; loss of smell, taste, and hearing; facial paralysis; tinnitus aurium; epiphora; neuralgia; difficulty in swallowing and breathing; and epileptiform convulsions. The patient may become apathetic, and the cerebral functions are liable to be affected. After the disease is well established, the deformity is marked, but varies with the seat of the pathological process. All of the bones of the head may be involved, but in varying degree. The frontal and the upper maxillary bones are generally the most affected. The lower jaw is less often involved. All of the bones of the vault of the cranium may become extensively thickened and sclerosed. The weight of the skull may become very greatly increased, and the sutures to a large extent obliterated. The orbits are very likely to be involved at some stage of the disease. Their capacity becomes greatly lessened by the encroachment of the bony tissue. The exophthalmus is sometimes extreme. Optic neuritis and atrophy are reported in some instances.

The hyperostosis may not be limited to the cranium; the vertebræ also may be affected. This appears to have occurred in Starr's case. It has been stated that in one case some of the other bones of the body were involved. These cases render the supposition that the disease is one of nutrition, allied to acromegaly, worthy of consideration.

In most of the reported cases no apparent cause for the disease has been found, and no characteristic lesions in the soft tissues have been discovered.

The diseases with which hyperostosis cranii is most likely to be confounded are acromegaly, myxœdema, and ostitis deformans. Acromegaly is excluded by the absence of enlargement of the hands and feet; myxœdema, by the condition of the subcutaneous tissue. Ostitis deformans is less easily eliminated. Diffuse hyperostosis generally begins early in life, ostitis deformans after forty. The changes in the long bones, the characteristic gait and posture in ostitis deformans, together with the fact that the head is less involved in this disease than in hyperostosis, should be sufficient to enable a differential diagnosis to be made.

No known treatment has any effect upon the disease. It

is to be hoped that accumulated observations and future research will disclose its nature, and that means of staying its progress may be discovered.

The patient is a man sixty years of age. His father was healthy but was killed when the patient was very young. His mother died at the age of seventy-six. He had seven brothers and sisters, all of whom are alive and well with the exception of a sister, the cause of whose death he does not know. He was well up to the age of fifteen, when he had an attack of typhoid fever. He went to sea at eighteen, and followed it for six years. He had an attack of dysentery which lasted two months, and what he terms a "touch of the scurvy" during this time; but no other illness until the beginning of his present trouble. Four of his children died in infancy; six are living in good health.

The patient began to have severe headaches, which recurred almost daily, about twenty-eight years ago. About seven years later his friends began to notice an increased prominence of his eyes. His general health remained good, however, and he was enabled to continue his occupation of farming without difficulty. Twelve years ago he suddenly noticed that he could not see with his left eye. A few months later the sight of his right eye began to be affected.

My notes, taken in June, 1887, state that there had been three lacrymal abscesses, at various times, on the left side, and, at the time of writing, one was threatened upon the right. The tears overflowed, and the nose was so occluded that he could not breathe through it. The sense of smell was almost entirely lost. There was very marked exophthalmus, and the eyes had lost a large share of their motility. The head was unusually large; the enlargement particularly affecting the temporal regions. The infra-orbital regions were very prominent. The deformity was very marked. There was only perception of light in the left eye. Both eyes were myopic 2.50 D. The central vision of the right eye was $\frac{18}{60}$, but its visual field was contracted. The ophthalmoscopic indications of optic atrophy were marked in the left eye, and present to some extent in the right.

I did not examine the patient again until July, 1896. The photographs Nos. 2 and 3 (text-plate X.) were taken about two weeks later. They should be compared with the first photograph taken thirty years previously, before the onset of the disease. The ap-

pearance of the patient had not changed very noticeably during the nine years that had intervened since the first consultation.

The patient was able to continue his work until seven years ago. At that time he had a sudden attack, the nature of which is unknown, which caused him to fall from his wagon. He thinks he did not lose consciousness at the time, but this is doubted by his friends. He was carried home and was confined to his house for weeks. No very exact conclusions as to his condition at that time can be drawn from the account he is able to give. There was great weakness, and difficulty in walking, but there does not seem to have been any true paralysis. He has been unable to work since this attack. For some time he had occasionally what he calls "dizzy spells," in which he was unable to stand but did not lose consciousness. He has been free from these for several years. He walks with considerable difficulty, and his movements are stiff and awkward.

July, 1896, the central vision of the right eye was $\frac{2}{8}\frac{0}{0}$, but the visual field was very much restricted. There was no perception of light in the left eye. After this time the failure of vision of the right eye was rapid. October 26, 1896, the vision of this eye was hardly $\frac{2}{2}\frac{0}{0}\frac{0}{0}$, and its visual field was contracted to an area about ten degrees in diameter. The ability to recognize colors was almost entirely lost, and there were marked ophthalmoscopic evidences of optic atrophy. In a few months all vision was lost with the exception of perception of light in the right eye, which still remains.

The condition of the patient has not changed very materially during the past two or three years. He feels fairly well, and is able to get about. His appearance is very striking. He is a small man and formerly wore a small hat; he now wears a $7\frac{3}{8}$ size. The circumference of the head is 58 *cm*. The enlargement of the cranium chiefly affects the temporal regions and the upper part of the face. The great change in the size and shape of the head is very apparent in a comparison of the first with the last two photographs. The forehead was formerly narrow and the eyes small and deeply set. The exophthalmus is very marked on both sides, and the eyes are widely separated. The centres of the palpebral apertures are 87 *mm* apart. The left eye diverges 5 *mm*. There is almost entire loss of motility of the eyes, especially upwards and laterally. There is no facial paralysis or loss of hearing. The skin and subcutaneous tissues are normal, and

there is no enlargement of the extremities. The leonine expression of the face is very noticeable, and the aptness of Virchow's designation is strikingly apparent.

This case is a typical example of diffuse hyperostosis confined principally to the frontal region and the upper part of the face. The orbits are very much involved. The optic atrophy was very probably occasioned by mechanical interference with the nutrition of the nerves by stenosis of the optic foramina. The contraction of the visual field, before blindness supervened, was the form characteristic of simple optic atrophy.

A very interesting point is that the patient asserts that the myopia of 2.50 D, for which he formerly wore glasses, came on with the hyperostosis. As a sailor he possessed an average acuteness of vision, and had no difficulty in discerning objects at a distance with the unaided eye. It is possible that the myopia was due to the pressure of the muscles of the eye made tense by the pressing forward of the eyeball by the contracting orbit.

The long duration of the disease is worthy of note. It is highly probable that the headaches from which the patient formerly suffered marked the beginning of his disease. This would indicate a duration of nearly thirty years. It should be noted that the disease began after the age of thirty, unlike the majority of reported cases. It does not seem to be progressing to any extent. Measurements of the head taken recently agree very well with those made three years ago. A gratifying feature of the case is the improvement in the cerebral symptoms. As these symptoms were probably due to compression of the brain, or interference with its circulation, we have reason to believe that some compensatory change has taken place in the patient's condition.

A CONTRIBUTION TO THE TECHNIQUE OF ADVANCEMENT FOR STRABISMUS.

By Prof. SCHWEIGGER, Berlin.

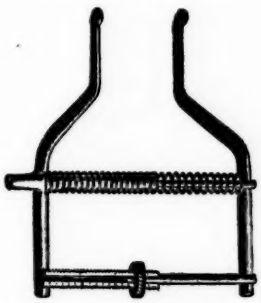
(*With one figure in the text.*)

Translated by Dr. Ward A. Holden.

IT is well known that if the deviation in convergent strabismus is more than 5–6 *mm*, or more than 4–5 *mm* in divergent, the tenotomy of the over-active muscle must be accompanied by advancement of its antagonist. I have seen no effect from advancement alone without tenotomy of the opposing muscle. (See *Archiv f. Augenheilk.*, xxix., pp. 194 and 195.) The dictum then laid down by me (*ibid.*, p. 199) that the shortening of the antagonist must equal the linear measure of the deviation, I have since fully confirmed. Herein lies a practical advantage of the linear measuring of the deviation as proposed by Graefe. The customary method by measuring the angle of deviation furnishes no operative indications, while the linear measure, which is so easy to carry out, indicates at once the amount that the antagonist is to be shortened in the advancement. For the technique of the advancement operation it is, therefore, of importance to find a method which shall determine in the simplest and most accurate way the amount that the muscle is to be shortened.

First, the conjunctiva is divided over the insertion of the tendon and loosened above and below, and then a slightly curved squint-hook, without a bulbous end, is slipped under the muscle. Tenon's capsule frequently hinders us in iso-

lating the muscle, and in such cases it must be dissected from the muscle carefully. One must be sure that he has taken up the entire muscle with the squint-hook, and since it may happen that at its first introduction the hook is passed through the muscle, it is necessary afterward to pass a second hook under the muscle in the opposite direction, so that, if necessary, the first hook may be withdrawn and re-entered in the right position. One hook is then passed under the tendinous attachment of the muscle, while the second hook is passed under from the other side, and the muscle, if necessary, is dissected free. It is now necessary to introduce the sutures into the muscle at the proper point—*i. e.*, as far behind the tendinous insertion as it is



desired to shorten the muscle, and this distance may be measured off on a millimetre scale. If the two hooks are held by an assistant, unavoidably the muscle is more or less stretched, affecting the accuracy of the measurement. In order to stretch the muscle as little as possible and to render the necessary stretching uniform, I have devised a little instrument, which consists of the ends of two squint-hooks 4 *cm* long, a spiral spring which holds them apart, and a screw marked in millimetres which acts against the spring.[1]

The screw is so arranged that the two squint-hooks are forced apart by the spring only a distance equal to the

[1] To be had from R. Wursch, manufacturer of surgical instruments, Berlin, C. Neue Promenade 5.

length of muscle which is to be removed. This adjustment of the instrument is made, of course, before the beginning of the operation, and the distance between the two squint-hooks may be accurately measured either by the scale on the instrument or by another scale. After the muscle is dissected free the instrument is pressed together with the fingers and passed beneath the muscle between the two squint-hooks which are held by the assistant. The squint-hooks are then removed and the instrument is left to the working of the spring, which pushes one hook beneath the tendon toward the cornea, while the other hook indicates the place where the sutures are to be introduced. It is immaterial whether the instrument is inserted beneath the muscle from above or below; it is to be determined in each particular case how it may be introduced. The muscle is not stretched by this instrument and the shortening necessary corresponds exactly to the previous measurement. The catgut sutures are introduced close to the peripheric hook, one suture being passed beneath the muscle from above, emerging below the centre of the muscle, the second suture being passed from below, emerging above the centre of the muscle. If it is seen that the muscle is poorly developed, as is frequently the case in high degrees of strabismus, the effect may be increased by introducing the sutures, not at the inner side of the peripheric hook, but at its outer side. After the sutures are properly introduced, the muscle is cut and sutured to the tendinous attachment, but in such a manner that the sutures pass beneath the tendon through the superficial layers of the sclera.

I am not accustomed to correct more than 6 *mm* of deviation, and when there is more the operation is divided between the two eyes. Advancement is made on one eye and, some weeks later, when the permanent effect is reached, the other eye is operated on, tenotomy with or without advancement being done according to the amount of deviation. In cases of divergent strabismus the operative effect is, as a rule, less than in convergent strabismus, and here the amount of advancement must slightly exceed the deviation. Even in divergent strabismus following tenotomy of

the internal rectus I have found the suturing of the rectus to the tendon to be of value; the conjunctiva, however, must be very carefully dissected to guard against cutting with the conjunctiva the insertion of the tendon, which is usually united to it by the scar.

DISTURBANCES OF CIRCULATION IN THE RETINA FROM ARTERIO-SCLEROSIS.[1]

By C. ZIMMERMANN, M.D., Milwaukee, Wis.

THE causes of disturbances of circulation in the retina very often remain unexplained. Even in the well-studied field of embolism of the central retinal artery cases occur in which the origin of the embolus cannot be found, especially if there is no heart disease. Kern (*Inaug. Diss.*, Zuerich, 1892), for instance, published ten such cases out of twelve, and gives a critical review of the incident literature. He found that in 66 per cent. of eighty-three cases no certain cause of embolism was given, and reached the conclusion that in the majority of cases presenting the aspect of embolism of the central retinal artery not embolism, but thrombosis, in consequence of a local affection of the artery, mostly atheroma, had taken place. In twenty-four cases arterio-sclerosis, in five symptoms of chronic nephritis, and in six syphilis could be revealed. Wagenmann (*v. Graefe's Archiv*, 44, p. 219), who also discussed these questions in an elaborate paper, designated it as the task of further investigations to ascertain more thoroughly the influence of local disease of the retinal arteries on the creation of disturbances of circulation, especially arterial thrombosis.

According to Ribbert (*Lehrbuch der path. Hist.*, p. 221), arterio-sclerosis of the larger vessels affects all layers of the vascular coats, whereas in the smaller ones it is localized in the intima as *endarteritis proliferans*. Such a condition of the retinal arteries was found microscopically by Reimar in

[1] Extended from a paper read before the Wisconsin State Medical Society at Oshkosh, May 5, 1899.

a case of "hemorrhagic retinitis in consequence of endarteritis proliferans," in which from the ophthalmoscopic appearance the diagnosis thrombosis of the central retinal vein had been made (these ARCHIVES, Ger. Ed., xxxviii., 3, p. 209). All the retinal arteries showed arterio-sclerotic changes: general or partial crescentic thickening of the intima, which consisted of more or less cellular fibrous tissue, as much as almost completely filled the lumen. The endothelium could not be differentiated from the underlying cells of the proliferations, but in all preparations of the central retinal artery it was marked as a central tract of more intense staining, and in most of them lining a long central fissure. From this Reimar infers that a small lumen still existed during life, which was closed by postmortal contraction of the arterial walls. The changes of the intima were not continuous throughout the whole length, but scattered over different places of the same artery. Several twigs were totally obliterated, being transformed in concentric fibrous cords. In some places the adventitia was infiltrated with round cells, invariably so where it was crossed by an obliterated vessel. The veins also revealed phlebitis proliferans, and some small branches were obliterated. These could be distinguished by their homogeneous walls from the more or less marked fibrillar, concentrically stratified coats of the obliterated arteries. Reimar excludes the possibility of thrombosis or embolism in this case from the histological structure, the integrity of endothelium, the absence of remnants of foreign substances, blood-pigment, and reactions of the walls, and thinks that of all cases of thrombosis of the central retinal vein hitherto published an obturating formation in organic connection with the wall existed only in those of Michel (*v. Graefe's Archiv*, xxiv., 2, p. 37), Weinbaum (*ibid.*, xxxviii., 3), and Türk (*Beitr. z. Aug.*, 1896, 24). It was doubtful, however, whether this was an organized thrombus or the product of phlebitis proliferans. In Reimar's case the sudden interruption of circulation was due to *endarteritis proliferans* by which the lumen grew constantly smaller until it became entirely closed, either by sudden sinking of the blood pressure yielding to the contraction of the muscles and elastic

fibres of the arterial walls, or by a primary contraction of the circular muscular fibres. The partial proliferation of the intima is more favorable for the latter mechanism by the formation of a more or less wide fissure which can much easier suddenly collapse than a small central lumen remaining from a uniform concentric thickening of the intima.

This explains the post-anæmic hemorrhages: after increase of the blood-pressure or decrease of the contractions of the arterial walls the lumen again becomes permeable, but now extravasations take place through the arterio-sclerotic walls, which have become more damaged by the temporary ischæmia. Their quantity depends upon the duration of interruption, the degree of degeneration, the amount of blood-pressure, the quality of the blood, etc.

There were also numerous miliary aneurysms in consequence of arterio-sclerosis, which so far have been very rarely described in the retina. Mackenzie and Nettleship saw them in diabetic retinitis, Litten in a case of retinal and cerebral hemorrhages, C. Zimmermann in eclampsia with cerebral hemorrhages (these ARCHIVES, vol. xxvii., No. 5).

The further course of endarteritis proliferans is re-enlargement of the lumen by shrinkage of the hyperplastic intima from regressive changes (caused by the lack of blood supply), as observed opthalmoscopically by Reimar, or obliteration by organic union of the walls. Relapses occur by affections of other parts of the arterial walls.

Similar anatomical descriptions were published by Alt (*Am. Jrl. of Ophth.*, 1898, p. 303), and by Lurje (*cf.* Friedenwald, these ARCHIVES, vol. xxv., p. 183), and others.

Owing to the sudden closure of the central retinal artery Reimar's case belongs to the class of *embolism*, from which it is distinguished by the copious hemorrhages, and its clinical picture corresponds in many points to that of *thrombosis* of the central retinal vein at first described by Michel (*v. Graefe's Archiv*, xxiv., 2, 1878), but deviates from it through the arterio-sclerosis of the arteries and the condition of the veins which are normal or only slightly engorged.

In another paper Reimar (these ARCHIVES Germ. Ed., xxxviii., p. 291) gives the clinical histories of three cases of

"so-called embolism of the central retinal artery and its branches," with a critical review over the incident literature, from which he derived the following conclusions:

"1st. Total interruption of circulation is characterized by breaking of the blood column into separate cylinders (agglutination of the cells, globular stasis) in the vessels below the impediment.

"2d. Whereas many symptoms of the clinical picture of these cases cannot be explained by the assumption of embolism or thrombosis, the supposition of endarteritis proliferans answers all requirements, and is to be made, when thickening of the arterial walls is visible with the ophthalmoscope. Embolism and thrombosis, which, of course, can occur in the retinal arteries, entail total blindness and globular stasis of the blood columns in the affected vessels."

I beg leave to communicate the following case which is an illustration of *thrombosis from arterio-sclerosis (endarteritis proliferans) of a branch of the central retinal artery:*

A man, aged fifty-two years, while working in his office, on April 5, 1897, suddenly noticed an obscuration of the nasal side of the visual field of his left eye. The vision was not abolished entirely on that side, but everything looked as if covered by a veil, so that he felt greatly annoyed in his work. On April 7th he came to me and presented the following condition: VR—$\frac{15}{20}$. Pupils react normally. Ophthalmoscopically: At a distance of three papillary diameters from the optic disc the upper temporal branch of the retinal artery just before its bifurcation into two secondary branches, is bloodless and appears empty, and the red blood column at that point suddenly stops. It has a gray, instead of a red colour, but is not diminished in size. The same condition prevails in the two branches for a length of about one papillary diameter. Then the upper one shows a small, dark red accumulation of coagulated blood, and appears empty again for a very little way, and three further such distinctly separated dark-red blood cylinders follow until the periphery of that branch has the normal red appearance of an artery filled with circulating blood. The inferior twig of the bifurcation is also gray in the extension of one papillary diameter, whereas its continuation and further branches are seen as red but thinned vessels. This infe-

rior branch crosses the upper temporal vein just below the arterial bifurcation. The portion of the vein between this crossing and the next two peripheral ramifications is extended and thicker than the rest above and below, but the whole vein is thicker peripherally and is growing thinner towards the optic disc. (The same observation of Reimar has been mentioned above.) Sometimes it appeared as if there was a slight pulsation in the enlarged vein. The retina tributary to the upper temporal artery is opaque, *i. e.*, from the point of interruption of circulation, the upper border of the opacity runs a little way above the upper branch, and the nasal border a little centrally from the lower branch towards the periphery and down towards the macula. It gives the well known aspect as in embolism of the central retinal artery, and the macula appears as a red spot, more marked than the remaining normal fundus. Corresponding to this grayish area of the retina, a defect of the visual field in the lower nasal quadrant is found. If we take as the zero point the right end of the horizontal meridian the scotoma lies between meridian 205° and 270° in the following manner: in 205° from 10° to 60°, in 225° from 5° to 60°, in 250° from 10° to 45°, and in 270° from 10° to 35°, *i. e.*, the sector-like defect does not reach the centre, and only in two meridians the periphery.

The general health of the patient is good. Syphilis denied; he drinks six glasses of beer a day. Heart shows no disease, second tone is a little more accentuated. Pulse dicrotic, and radial artery tortuous and resistent. Blood vessels of face ectatic. Decided symptoms of *Arterio-sclerosis.*

It seems most natural to suppose that this was a case of embolism of a branch of the central retinal artery. The following reasons, however, speak against this assumption:

First—No embolus could be seen in the obstructed vessel. (According to Reimar an embolus will not form a cast fitting exactly in the vessel, but both its ends will separate the blood column like a wedge.)

Second—There was no heart trouble. The chief source for embolism of the retinal artery is furnished by endocarditis or valvular disease of the heart, *i. e.*, by pieces of the diseased valves or of breaking thrombi. Arterio-sclerosis of the aorta and carotis may also give rise to embolism of the retinal arteries by abrasions of particles of the diseased

intima and thrombi formed on such places. This, however, is not very probable in this case, since more embolisms of other arteries would have been more likely to occur if such changes had existed to any extent.

Third—No evidence of a tumor was found from which particles might have been carried away by the blood-current.

Fourth—There was from the commencement no complete blindness, but only a scotoma which remained, whereas in partial embolism the sight generally becomes entirely abolished when the embolus enters the main artery, and is partially regained after the embolus is conveyed further and becomes blocked in a branch. The interruption of circulation, *i. e.*, the lack of supply of oxygen must not, however, last longer than a few minutes lest the nervous fibres in the optic nerve and retina become necrotic.

Endarteritis proliferans has the same effect if it shuts off the circulation, and, if happening on the limbs, leads to gangrene, but not in the retina, which has two separate vascular systems, and, after closure of the central artery, derives still some nourishment from the chorio-capillaris. The connective-tissue fibres remain intact, but the more sensitive nervous elements are destroyed.

On the other hand, thrombosis of a branch of the retinal artery leaves the main artery intact and never produces initial total obscuration of sight, only a scotoma corresponding to the area of the retina, which derives its nourishment from that branch.

This point as well as other positive symptoms in our case rather indicate that the obstruction of the vessel was due to arterio-sclerosis of the retinal arteries and consequent arterial thrombosis. Besides the arterio-sclerotic changes of the peripheral arteries, the sclerosis of the retinal vessels could be directly observed with the ophthalmoscope. The upper temporal branch above the bifurcation had a cartilaginous bluish-white and transparent appearance from thickening of its inner coat. That the same condition was not found on all branches is not surprising, since arterio-sclerosis is a partial phenomenon which occurs in patches like exanthemata of the skin. Although met with in the length of vessels, its places

of predilection are the ostia of the branches, or bifurcations (Virchow, Thoma, *Virchow's Archiv*, 93, 95, 104–106, and *v. Graefe's Archiv*, xxxv., 2), where it forms rings and leads to stenosis, and further on to ischæmia and autochthonous thrombosis. (Heubner, Leipzig, 1874; Friedlaender, *Cent'bl. f. d. med. Wiss.*, 1876, 4; Baumgarten, *Virchow's Archiv*, 1878, p. 90; Borchard, *Deutsche Zeitschr. f. Chir.*, 44, 1896; Haga, *Virchow's Archiv*, 152, 1, 1898; Wwedenski, *Arch. f. kl. Chir.* 57, 1, 1898; Raehlmann, *Fortschr. d. Med.*, 1889, p. 928; Reimar, *l. c.*).

Then we see, with the ophthalmoscope, disintegration of the blood column which consists in a sedimentation of the red blood corpuscles from the plasma to dark red cylinders. The spaces between the red cylinders are not empty, but are filled with plasma, or are collapsed, contracted, or have thickened walls. The retinal vessels are empty only if their physiological contents are removed, viz., after being cut (C. Zimmermann: "Laceration of the Optic Nerve and the Central Retinal Blood-Vessels," these ARCHIVES, vol. xxvi., No. 1), or at the optic disc during collapse of their walls by the intraocular pressure in venous pulsation, or after death. The arterio-sclerotic portions of the vessels appear as indentations of the calibre of the blood column, but their external contour is as wide as the normal. The thickening of the wall is not always conspicuous, but is recognized by a fine gray or yellowish-gray opacity. Often the thickening is so intense that the diseased portion presents itself as a solid bloodless cord, which may, however, convey circulating blood. A certain symptom of stoppage is the globular stasis below. The degree of visibility of the thickening of the intima is, of course, dependent upon its stage of development.

Clinically correspond to these different stages transient obscurations of sight caused by defective blood supply of the retina in consequence of the retardation of the blood current in the narrowed vessels and finally total blindness.

In our case the endarteritis proliferans terminated in thrombosis, first, because the blindness in the described sector was total and lasting, and second, the globular stasis below the obstruction was permanent.

Lately Wagenmann (*v. Graefe's Archiv*, 44, p. 220) reported a case which showed numerous attacks of fugitive obscurations of sight, which he attributed to spastic constrictions of the retinal arteries brought about by arterio-sclerosis. He thinks that the endarteritic changes exert an irritative influence on the vascular walls and produce spasms of the vessels. During such an attack he could see with the ophthalmoscope complete ischæmia of the retinal arteries, the lumen of which was narrowed by thickening of the intima, with resulting abolition of function. It is an analogous process to the arterio-sclerosis of the coronary arteries of the heart which leads to relapsing stenocardic seizures.

Spasms of the retinal arteries were further observed in epilepsy and some intoxications and general diseases, and were caused by arterio-sclerosis.

Galezowski, Dujardin, and Fraenkel (*Berlin. klin. Woch.*, 1897, p. 341) described cases of thrombosis of the central retinal artery (which in Fraenkel's case presented the aspect of embolism) in influenza, and attribute the cause of it to changes of the arterial wall created by infection or intoxication of the organism. According to v. Leyden the disintegration of white blood corpuscles in infectious diseases produces blood-plates, which are an essential factor in the development of thrombosis, but the latter forms only on those points of the vascular coats which are diseased. Also here arterio-sclerosis plays the most important part, as influenza has a tendency to develop arterio-sclerosis, according to some French authors, who speak of *Artérite grippale*, and to the observations of Curschmann.

Raynaud's disease, which consists in a local asphyxia of the limbs, is sometimes accompanied by disturbances of vision, which, in some cases, the ophthalmoscope proved to be due to contractions of the retinal arteries. The anatomico-pathological changes were, besides neuritis of peripheral nerves, endarteritis and endophlebitis of the smaller vessels.

Panas, who examined the patients at the instance of Raynaud, could not corroborate this statement, and von Frey maintains that artificial constrictions of the vascular muscles equally extend over larger portions of the vessels.

The irregular short indentations which last for some time are no constrictions but diseased portions of the walls (Reimar).

A very important predisposition to thrombosis of the retinal arteries is produced by *syphilitic endarteritis*. Kern reported such cases and Wagenmann one which was very similar to ours. It occurred in a syphilitic patient with very extensive arterio-sclerosis. The retinal arteries were also sclerotic and showed opaque lines. The upper nasal branch was very much thinned and apparently closed by endarteritis and thrombosis, with a corresponding defect of the lower outer quadrant of the visual field. Although it looked like partial embolism, Wagenmann took it for thrombosis on account of the marked arterio-sclerosis of syphilitic origin and the absence of heart trouble.

The ophthalmoscopic condition in our case, although the same as that of embolism, may just as well have been induced by endarteritis proliferans and subsequent thrombosis, since the latter occurred suddenly, and the consequences of acute obstruction must be the same whether caused by an embolus or momentous thrombosis, or simply endarteritis proliferans. For the diagnosis of endarteritis and subsequent thrombosis the ophthalmoscopic arterio-sclerotic changes will be of importance.

The *prognosis* is very unfavorable when the disturbance of sight has existed for some time, as the nervous elements of the retina can survive an interruption of circulation only for a few minutes. Arterio-sclerosis of the retinal vessels, even without thrombosis, is prejudicial to the eye, as it may give rise to *hemorrhages* and *glaucoma*. Disturbances of retinal circulation and increase of intraocular pressure are, according to Wagenmann (*von Graefe's Arch.*, xxxviii., 3, p. 258) and Reimar, both dependent upon a common cause, viz., vascular alterations of the body and the eye, and microscopical examinations of glaucomatous eyes have disclosed chronic degenerative changes of the retinal vessels.

For *treatment* massage may be recommended, in transient obscurations iridectomy, and mercurial inunctions when the endarteritis is due to syphilis.

TUBERCULOUS IRITIS, WITH PARENCHYMATOUS KERATITIS.

By Dr. S. SCHULTZE, Frankfort-on-the-Main.

(*With two figures on Plate XI., Vol. XXXIII., Ger. Ed.*)

Abridged Translation, by Dr. Ward A. Holden.

IN recent years there have been made many reports showing that parenchymatous keratitis is frequently due to tuberculosis, and in some cases pathological examinations have been made. I wish here to report a case of parenchymatous keratitis, combined with tuberculous iritis, which does not differ particularly from those hitherto described, occurring in a young man who was otherwise perfectly healthy.

A stone-worker, aged twenty, consulted me in December, 1894, stating that for several months he had suffered from an inflammation of his left eye, which appeared without any assignable cause and had not been improved by treatment. He complains of photophobia, lachrymation, and failure of vision in the left eye, which previously had been healthy, but the eye has not been painful.

St. pr.: Right eye normal. The left eye shows a moderate conjunctival and subconjunctival injection, mostly near the corneal margin; the cornea in its lower half is diffusely opaque, with lustrous surface and no visible vessels. In the anterior chamber, occupying nearly the entire lower half, is a grayish-yellow exudation, which, in its deeper layers, appears almost purulent. The iris has undergone greenish discoloration, and the markings are obscured; the pupil is small and is adherent to the lens by

numerous synechiæ, which atropine does not break up. The fundus cannot be seen. The tension is normal, the eye is not sensitive to pressure, the visual field is not restricted, and V $= \frac{0}{200}$.

The patient states that he is of healthy family and has always been well, except for pulmonary hemorrhages six years before, from which he quickly recovered. A physical examination failed to reveal any signs of disease except a slight dulness at the apex of the right lung. There was neither cough nor fever. Syphilis was denied. The patient was put upon mercurial inunctions, iodide of potassium, atropine, and warm moist applications. No improvement having taken place after six weeks of this treatment, subconjunctival injections of sublimate were employed, also with out benefit. The diagnosis then being confined to tuberculosis or sarcoma, the eye was enucleated March 15, 1895, and a year later the patient was still in good general health.

The enucleated ball, which was of normal size and form, was fixed in 10 % formol, hardened in alcohol, divided in half, cut in celloidin, and the sections stained with hematoxylin or carmine.

The cornea is 1 to 1.2 *mm* thick, *i. e.*, slightly thicker than normal; the epithelium is everywhere present, but is reduced to 2–3 rows of cells, and Bowman's membrane is normal.

Throughout the entire ground-substance of the cornea is a round-celled infiltration, the cells lying near the corneal corpuscles within the dilated lymph-spaces. This infiltration is less marked in the superficial layers of the cornea, but near the sclero-corneal margin the cells form distinct nodules (Figs. 1 and 2, Pl. xi.), although typical tubercles are not found. In the centre of the cornea there is a collection of round cells in the deep layers directly over the membrane of Descemet, which is so great that it causes a bulging of the posterior surface of the cornea and resembles a tubercle (A, Figs. 1 and 2). Besides these darkly stained round cells there are many less darkly stained, elongated, corneal corpuscles between the bundles of fibrillæ, which exceed the corneal corpuscles of the normal cornea both in size and number.

The bundles of fibrillæ show no marked changes, such as swelling, compression, suppuration, or degeneration.

New blood-vessels are found throughout the entire cornea, but in greater number near the corneal margins.

The membrane of Descemet is well preserved everywhere, but here and there it is detached from the posterior lamellæ by accumulations of round cells.

The endothelium is preserved, and appears as a single stratum of flat cells with oval nuclei, upon which lies a layer of exudation composed of round cells and coagulated fibrin. At some points the round cells are present in considerable masses, and the endothelium there has disappeared. The larger masses of these cells lie beneath the nodular infiltrations in the cornea proper. At one of these points some giant-cells are seen, and the membrane of Descemet is broken through.

Under the epithelium, at the sclero-corneal margin, there are many accumulations of round cells strongly resembling miliary tubercles, and there are many medium-sized blood-vessels surrounded by round cells.

The angle of the anterior chamber on one side in almost all of the sections is occupied by an accumulation of cells (Figs. 1 and 2, T), which extends both into the sclera and into the iris and ciliary body. It has the typical structure of tubercle, being composed in its periphery of darkly staining round cells, and in its middle portions of paler epithelioid cells, while the central portion is a caseous mass with giant-cells about it. Vessels are wanting in the tubercle. A few tubercle bacilli were found. A smaller tubercle was present at the other angle of the chamber in some sections (Fig. 1, T), and in the iris were a number of aggregations of round cells with caseation or epithelioid cells, which would seem to be tubercles at an incipient stage. The sclera and choroid, retina and optic nerve, lens and vitreous were perfectly normal.

AMAUROSIS FOLLOWING THE ENTRANCE OF A WELL AFTER THE USE OF DYNAMITE.

By L. D. BROSE, M.D., Ph.D.,

OCULIST AND AURIST, ST. MARY'S HOSPITAL, EVANSVILLE, IND.

THE following instructive cases came under my observation Sept. 23, 1897:

Christ Waller, aged forty-seven, and married, went down into a well on his farm that had gone dry, and after drilling a hole some three to four feet deep into sandstone rock, inserted therein a stick of dynamite. This failing to explode when the attempt was made, he again entered the well and drilled a second hole near the one in which the dynamite had been placed, and charged it with blasting powder which, when ignited, set off the dynamite. The drilling work was done the morning of Sept. 13, 1897, and the explosives successfully set off at about 11 o'clock in the morning the same day, after which he went to his home for dinner and then returned to the well with two men to assist him. It was about half-past one in the afternoon when he re-entered the well by means of a rope ladder, and as he descended he tried to fan out the smoke with his hat. Soon thereafter he must have lost consciousness, since he uttered no word to the men above, and upon their calling to him he made no reply. Suspecting something wrong, one of the men outside entered the well to investigate, taking the precaution, however, first to fasten a rope under his arms and leaving the end in keeping of his companion. He rapidly reached the bottom where he found Waller in a sitting posture, unconscious, and his attempts to arouse him were futile. Hastily attaching a rope around his body, the man on the outside in a few moments succeeded in withdrawing it from the well. The rescuer, by name Hartley, a

single man twenty-three years of age, then started up the ladder, but when half-way out he likewise became unconscious and fell, lodging against the sides before reaching the bottom. His body was also drawn out by the fellow-workman above. The history of the two patients, kindly furnished by Dr. W. Wilson of Yankeetown, Ind., who was called to attend them, is very similar for the next twelve hours, both continuing unconscious until near midnight, when the man Hartley, who remained in the well but a short time, regained consciousness but could not see. It was not until 10 o'clock the following night, or some thirty-two hours, before his sight returned, while his memory was confused and poor for several days. Waller, who had been in the well some twenty-five minutes, remained unconscious some eight hours longer than Hartley, and when he did become rational the discovery was made that he too was blind. On the date already mentioned Waller was brought to my office in an express wagon, the bottom of which served as an ambulance. He was so weak and pale that it required the help of two men to support him in walking. His face was very pale, and his general appearances those of one afflicted with grave anæmia. The pulse was regular and the temperature normal. The eyes rolled about, and he was incapable of fixing them upon any object or distinguishing other than between light and darkness. The pupils were semi-dilated, with a slight inequality in size, the right being a trifle the larger. They both react to light reflected upon them with the ophthalmoscopic concave mirror. It was necessary to examine the patient lying down, and because of the inability to hold the eye in fixation only an indirect ophthalmoscopic examination was possible. The optic discs were seen clearly defined but pale in color, while the arteries of the fundus in general were small and the veins prominent and distended. Neither hemorrhage nor other lesion of the retina or vitreous was found. Mentally, so far as recalling any of the circumstances connected with his affliction, his brain is a blank: in fact he only knows there is a well connected with his trouble when told so, and he is utterly incapable of locating it or recalling who the men were who assisted him in his work. Patient was taken to St. Mary's Hospital and put on iron and strychnia, the latter administered hypodermically daily, beginning with grain $\frac{1}{60}$ and increased up to grain $\frac{1}{15}$. In addition, every day for five consecutive times he was permitted to inhale the contents of a pearl of amyl nitrate.

October 2d: Patient's general condition somewhat improved. He is able to sit up alone and when assisted walks about a little, but his gait is tottering and slow. He sleeps well, is free from headache, has a good appetite, and the kidneys and bowels act normally. A direct ophthalmoscopic examination was made, disclosing a pale optic disc with clearly defined margins. The paleness of the disc was general and not confined to one portion more than to another, and in keeping with his general appearance of anæmia. The intraocular arteries seen were small, and the veins full and distended. No lesion in the retina or choroid was discovered, while the ocular tension is normal. He is able to count one or two fingers with great effort and difficulty when held just in front of either eye. More than two fingers gives rise to confusion. The eyes fix and follow in all directions an object held close in front of them although unable to define its nature. The pupils react both to light and accommodation.

October 14th: His memory continues poor and he is still unable to locate the well or relate anything of his labor or associates there. Placed in a trial frame he recognizes red, blue, and green glass. The intraocular findings, with both direct and indirect examination, the same as already reported.

November 23d: Memory a little improved, likewise his general appearance; he has gained in flesh and improved in color. Vision still restricted to counting fingers held just in front of the eye. The strychnia injections again renewed with, internally, the elixir of phosphorus with calisaya and iron.

December 5th: Patient walks as well as usual and is fast losing his anæmic appearance. The intraocular blood-vessels appear normal when seen through the ophthalmoscope, and the optic disc is much more lifelike in color. Patient was permitted to go to his home in the country but continued under my observation, making a visit to my office every forty to sixty days. My last record dates March 4, 1899, at which time his mind is perfectly clear, and he relates clearly all the facts connected with his labor at the well and the names of those whom he employed to assist him. Physically he is above his average weight and in the full enjoyment of health. He is able to find a chair in my office, but feels his way before taking a seat. His gait is steady and devoid of weakness. The pupillary and other reflexes are normal, and with the ophthalmoscope one only sees that the temporal half of the disc is a little paler than it should be. His vision is still

restricted to counting one or two fingers held just in front of either eye, although objects held two feet away are fixed and followed in every direction of the visual field.

As to the man Hartley, who remained in the well but a short time, and who first came under my observation September 23, 1897, my record shows he had vision of $\frac{1}{15}$ in each eye and read Sn 1 well. He had wholly recovered memory and sight, and with the ophthalmoscope I could detect no trace of his temporary loss of vision. In the discharge of a stick of dynamite or blasting powder a number of gases are generated, but since the composition of these explosives, as found in the market, varies, the chemical reaction is not always the same.

In a recent article in *The Laryngoscope*,[1] by Dr. M. H. Simons, who was aboard the battle-ship *Iowa* during the various bombardments off Santiago, and while that vessel was engaged in the great naval fight, he writes of the uses and effects of the high explosive powders fired in the great guns, and states that through imperfect oxidation there is formed carbonic oxide gas, which is changed to the dioxide, carbonic acid gas, when the breech of the gun is opened. No cases of poisoning, however, by this gas came under his observation. There were developed, however, and treated, four cases of acute tonsillitis, one of acute bronchitis, and twenty-four cases of mild bronchial catarrh. In all of these there was an associated acute rhinitis, and in thirteen instances marked dulness of hearing. One case of mild conjunctivitis was likewise treated. That carbonic oxide gas is capable of producing loss of vision is corroborated by M. Schnitz, who reports two cases of poisoning by this gas in the *Annales d'oculistique*, in which vision was reduced to $\frac{1}{6}$ and only again became normal at the expiration of five months. Simeon Snell, in some "Remarks on Amblyopia from Di-Nitrobenzol,"[2] states that during the manufacture of these explosives and while the material is pulverized, reheated, and again cooled, a vapor is generated which is highly dangerous to persons engaged in the employment. He reports five cases of impairment of sight in the persons so engaged,

[1] Vol. vi., No. 5, May, 1899.
[2] *British Medical Journal*, March, 1894, No. 1731.

and gives their symptoms as follows. "A more or less complete loss of visual acuteness with concentric contraction of the visual field and at times a central color scotoma. The optic disc was pale, irregularly defined, while the retinal veins were congested. The patients upon ceasing to engage in their labors, as a rule, rapidly improved. He especially describes the general symptoms of poisoning as being manifested through the blood and nervous system. First the patients were highly anæmic, often with anæmic murmurs in the heart and larger blood-vessels, to a degree at times causing cyanosis of the mucous surfaces. A blood examination revealed many megalocytes such as are found in pernicious anæmia. The urine was markedly brown, due to some unknown aromatic substance. Second, trembling gait with great weakness in the extremities and a highly sensitive response to the effects of alcohol when administered even in small doses." I would attribute the loss of vision to an acute retrobulbar neuritis through a toxic agent that is readily taken up by the blood and exerts a highly destructive influence not only on the red blood-cells but also upon the nerve cells presiding over the highest centres of consciousness, memory and sight, as well as the bundles going to make up the optic tract and nerve itself. In none of the reported cases that have come to my notice have the memory and sight been so profoundly and so lastingly affected as in my patient Waller.

A CASE OF POISONING FROM THE USE OF ESERINE IN THE EYES.

By CLARENCE R. DUFOUR, Phar.D., M.D., Washington, D.C.

Mrs. N., married, white, aged thirty-five years, mother of several children, consulted me about her eyes; the main complaint being headaches, temporal and occipital. I found upon examining her eyes that she had myopic astigmatism, axes off the vertical. I deemed it best to use a mydriatic, so ordered a ʒ ss of a two per cent. solution of hydrobromate of homatropine, two drops of which were to be dropped into the eyes every fifteen minutes for two hours, at the end of which time she was to come to my office. On the morning of her appointment a lady, very much excited, came into the office and asked me to come at once to see Mrs. N., who was in a house in the square below mine. She said that my treatment had been so severe, she (Mrs. N.) had fainted on her way to my office. Upon reaching the place, I found that she had become so weak and prostrated that she had fallen on the side-walk and had been carried into a neighboring house. She was almost on the verge of collapse. Pulse weak and very slow, respiration difficult, intense pain in eyes and head, reflexes almost abolished, pupils contracted ad maximum, being no larger than a pin-point. I gave her a dose of atropine, digitalis, and nitro-glycerine, and repeated it at proper intervals until she was better and was able to give me the following history:

The prescription was obtained from their druggist, a graduate of pharmacy; and upon the first instillation into the eyes a most violent pain occurred in the eyes and head. She told her husband of this pain, but he said she was nervous and imagined the pain to be severe; upon subsequent instillations the pain increased and she became weak; she continued the treatment, supposing it was all right but very severe. She could ride within three squares of

the office, and when she had gotten off the cars and tried to walk she had only been able to go one square when she fell, completely exhausted, and in the condition described. I suspected eserine poisoning from the condition of the pupils, and from the color of the few drops left in the vial, which she had with her; they were of a faint pink color. After sending her home and explaining the case to her family physician, I saw the druggist, who admitted his mistake; he had given her a two per cent. solution of sulphate of eserine, of which she had put two drops into the eyes eight times. In a few days she was able to come to my office and have the examination finished. I used no mydriatic in the eyes to counteract the effect of the eserine, as the atropine given internally was sufficient.

This case was so interesting and unique that I have ventured to report it.

REFRACTION IN ANCIENT TIMES.

By Dr. VINCENZ FUKALA, Vienna.

Abridged Translation by Dr. Colman W. Cutler, New York.

I HAVE found in ancient literature many passages which treat of refraction and show that a number of questions were understood by the ophthalmologists of those times. Indeed, certain dioptric problems were solved which have remained unnoticed and which have been correctly answered only since 1860. Chief among these are questions regarding the cause of myopia, accommodation, and presbyopia, which have been considered achievements of recent times. Since these are not to be found in works on the history of ophthalmology, they may be given here briefly.

I. Myopia, Hippocrates (460 B.C.).

II. Aristotle explains the optical cause of presbyopia and myopia to which he first gave a Latin name (330 B.C.).

III. Albertus Magnus (1193–1280) explained the cause of myopia by a change in the position of the lens. Felix Plater (1536–1614) acquiesced in this theory.

IV. Plemp (Vopiscus Fortunatus, 1601–1671) recognized as a result of anatomical examinations the increased length of the eye as the true cause of myopia.

V. J. B. Morgagni (1681–1771) corrected Plater and Bonet (1602–1689), and by anatomical examinations demonstrated the increased length of the eye in myopia.

VI. Valsalva, Petit, and Morgagni gave as a cause of presbyopia a yellow discoloration and hardness of the nucleus of the lens.

VII. Morgagni gave a correct explanation of the mechanism of accommodation.

VIII. Janin (1776) described a second case of cataract operation on a young and highly myopic man.

IX. Eyeglasses were known probably several hundred years B.C.

The most interesting of these references is that in which Morgagni gives a correct explanation of accommodation a century and a half before Helmholtz approached the subject anew.

ON OPERATIONS WHICH INCREASE THE MOTILITY OF ARTIFICIAL EYES, AND THEIR PARTIAL REPLACEMENT BY A NEW PROTHESIS OF A PECULIAR FORM.

By Dr. HUGO WOLFF, Berlin.

Abridged Translation by Dr. Colman W. Cutler, New York.

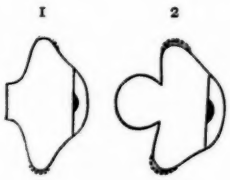
(*With two figures in the text.*)

THE operations which Mules proposed in 1885 and Kuhnt and Lang in 1887 (evisceration, enucleation with the insertion of a foreign body) have not been generally adopted by continental surgeons. Some are opposed to evisceration; others try to limit the indications for both operations and attempt to make eyes which would have to be removed wholly or in part, harmless by more conservative measures, such as the neurotomia optico-ciliaris, proposed by v. Graefe in 1857. As a substitute for this, since 1878 Schweigger has advised resection of the optic nerve. Scleral suture is performed at the present time in many cases, even where there is no hope of retaining vision or the form of the eyeball.

The author has found records of 383 cases of evisceration and 24 of enucleation with the insertion of a foreign body. In six cases among the former the globe which had been introduced escaped in a period of time between fourteen days and one year after the operation, and among the enucleations it fell out in two cases after ten months. No cases of sympathetic ophthalmia are mentioned, and Wolff concludes that there is little danger of such an event. The escape of the enclosed globe is due to the choice of too large

a size. Two cases are mentioned in which the result was satisfactory except for the limitation of motion.

The stump does not move ideally with the other eye because of the weight of the enclosed globe and because of the adhesions between the sclera and Tenon's capsule which follow prolonged inflammation. The stump moves better



than the prothesis placed upon it because of the friction and especially the form of the latter. To obviate these hindrances to a freer motion of the prothesis the author has attached it to the ball formerly introduced into Tenon's capsule, thus obtaining a better position and, because of the smaller size of the prothesis required, greater mobility.

REFERENCES TO THE LITERATURE.

MULES. "On the Surgical, Physiological, and Æsthetic Advantages of the Artificial Vitreous Body." *British Med. Jour.*, Dec. 19, 1885; Feb. 6, 1886; *American Jour. of Ophth.*, 1887, p. 287.

KUHNT. "Ueber Enucleatio Bulbi und Substitutionsverfahren derselben." *Corresp. Bl. d. Ärztl. Verein v. Thüring.*, No. 11, Nov. 25, 1887, pp. 455–465.

L. W. FOX. "Evisceration of the Eyeball." *Med. Bulletin*, Vol. xvii., p. 221; *Jour. Am. Med. Assoc.*, Jan. 8, 1898.

H. SCHMIDT. "Exenteratio Bulbi mit Kugel Einheilung." *Klin. Monatsbl.*, 1896, p. 367.

B. CARTER. "On Removal of the Eye and Mules's Operation." *Lancet*, July 31, 1897.

R. CROSS. "Sympathetic Ophthalmitis, especially in Connection with Mules's Operation." *Lancet*, June 26, 1897.

CONJUNCTIVITIS FOLLICULOSA AND TRACHOMA.

By Dr. O. WALTER, Odessa.

Abridged Translation by Dr. Colman W. Cutler, New York.

In recent times the interest in trachoma has increased and many attempts have been made to comprehend the still ill-defined subject. One writer speaks of follicles, another of granulations, and a third considers the tissue infiltration the essential part; and Axenfeld is quite right when he says: "There can be no chapter in ophthalmology where the number of personal opinions is so large as in that of trachoma. In the absence of certain proof of the parasitic origin of the disease, every one attempts to establish an etiological basis for his opinion, which, however, need be binding on no one else." Unfortunately such an objective attitude is not universal, and the contention about follicular conjunctivitis has led to a division into two camps: that of the dualists and that of the unitarians, in both of which objectivity is not always sufficiently observed. Professor Greeff in his recent *Studien ueber epidemische Augenkrankheiten*, says, on page 66: "First of all, the impossible unitarian standpoint must be given up." And, page 115, still more sharply: "If I look through the current literature, the specialists who adhere to the so-called unitarian standpoint, that is to say, a transformation of follicles into trachoma granules, are approaching the vanishing point. Whoever thinks in the modern scientific manner can no longer maintain this principle."

As a pupil of Rählmann, one of the leaders of the unita-

rians, who for years has given much time and labor to the study of trachoma, the author commits himself unqualifiedly to the unitarian position, and declares that he has never felt the need of setting up a disease sui generis in order to explain the nature of the milder forms; especially as in his trachoma material all forms of the disease are found from the mildest to the most severe.

Numerous citations are given to show that the dualists are not united among themselves in the differentiation of severe follicular conjunctivitis and mild trachoma. Saemisch says: "Follicular conjunctivitis is characterized by the development, with catarrhal symptoms, of round, pale red bodies projecting above the level of the mucous membrane, which finally disappear without leaving a trace." Saemisch calls these bodies lymph follicles, and the flat, white, roundish spots "collections of lymphoid elements," and describes them as situated, as a rule, in the fornices in parallel rows. Schweigger and Schmidt-Rimpler add nothing essential. Michel is quoted by the author as saying in his text-book, 2d ed., 1890, p. 201: "While it is possible or even probable that the same cause is at work, still two types of the disease must be recognized by their clinical course." These two forms, according to Walter, are conjunctivitis follicularis and trachoma, and Michel's description of the more severe form of follicular conjunctivitis is as follows: "The unusually swollen and hyperæmic fornix and neighboring tarsal conjunctiva, as well as that covering the caruncle, is sown with large and numerous follicles of a translucent, reddish-gray or a more opaque yellow to reddish-white appearance, from the size of a millet seed to that of a pea." Numerous quotations from the writings of Hirschberg, Kuhnt, Adamück, and others show a lack of harmony which leads the author to assume that among those who hold that the two diseases are independent, there is a lack of precision in their definition, and little agreement on certain points which are essential to their separation clinically.

The author continues: Most of the dualists acknowledge that a differential diagnosis between conjunctivitis follicu-losa and conjunctivitis granulosa cannot always be made at

once. For example, Greeff states that in West Prussia, among 3025 inhabitants, there were 299 with trachoma and 390 cases designated as suspicious. So, concludes the author, Greeff could not make a diagnosis in the majority of cases, and Kuhnt's statistics show the same difficulty. When Greeff points to the ordinary diarrhœa during a cholera epidemic, or to the relation of angina with fibrinous deposit to diphtheria as an explanation or excuse for this uncertainty in diagnosis, and from this analogy concludes that follicular conjunctivitis and trachoma are separate diseases in spite of the similarity of their symptoms, there is much to say in opposition, as Walter demonstrates at some length. He then takes up the assertion that the number of those who adhere to the idea of the unity of the two forms of conjunctivitis is approaching the vanishing point, and cites a formidable number of Russian specialists who with their large opportunity for the study of trachoma, are of the same opinion as Rählmann.[1] According to Rählmann, Pick,[2] and Feodorow,[3] the follicles may disappear entirely, leaving no trace, or they may be sclerosed, or in severe cases a superficial ulceration leads to an escape of the contents. The writer, then, and those of his faith do not believe that follicular conjunctivitis becomes trachoma, but that it already is trachoma.

From this standpoint he believes that regions said to be free from trachoma become rare, and that places should be described as having malignant or benign forms of the disease, as one speaks of malarial districts.

---

[1] *Graefe's Arch. f. Ophth.*, xxix., 2.
[2] *Arch. f. Ophth.*, xliv., 3, p. 614.
[3] *Dissertat.*, Moscow, 1896; reviewed in *Centralblatt f. Augenheilkunde*, March, 1897.

THE LIGHT SENSE AND COLOR SENSE IN DISEASES OF THE RETINA, CHOROID, AND OPTIC NERVE.

By Dr. HANS KRIENES, Breslau.

Abridged Translation by Dr. Colman W. Cutler, New York.

(*With Plates XXII.–XXIII. of Vol. XXXIII., German Edition.*)

PHYSIOLOGICAL PART.

VISION depends on the presence of certain visual substances which probably lie in the outer layers of the retina. Of these substances, visual purple is the only representative known as yet, illustrating the process of consumption and restoration peculiar to the class. They are secreted by the pigment epithelium and deposited in the rods or cones. The choroidal vessels provide nutrition and serve in their preparation.

These visual substances are chemically transformed by light into exciting substances which act on the light-conducting apparatus as stimuli which are transmitted to the visual centre where they produce sensations of light and color. The photochemical breaking up of the visual substance into substances producing the stimulus, is called by Hering dissimilation (dissociation, Donders), and the restitution of the used substances is called assimilation.

We distinguish two substances, one not yet photochemically transformed, an assimilated, or A substance, and a second, the result of the action of light on the former, a dissimilated or D substance, which acts as a stimulus to the transmitting apparatus.

Light works in two ways: it breaks up or dissociates the A substance, and as it increases in strength the dissociation is intensified, but, on the other hand, it aids and increases the process of assimilation. The assumption of such a cyclic action of light in making good on one side the loss it has caused on the other, does not seem too artificial, for if light causes in the eye an increased circulation of blood and lymph as it does in the skin, the nutrition or assimilation is aided and the products of combustion or dissociation are removed under its influence.

Light acts on the eye not only when it enters the pupil, but also when it falls on the sclera, and probably its effect on the circulation and combustion, and indirectly on assimilation, is to a large extent dependent on this latter mode. Schmidt-Rimpler has shown that if the sclera of a normal eye is moderately illuminated, the central vision is improved, but if the scleral illumination is intense, vision is depressed; ordinary, diffuse daylight, however, which strikes the eye laterally, diminishes the perception of differences as compared with that taking place when the eye is shaded (see table in original). This diminution means fatigue—that is, relatively too much dissociation. Fatigue must follow the fall of light on the sclera the more readily as there is no protection provided in this case by the advance of pigment. I believe we have paid too little attention hitherto to fatigue due to scleral illumination.

In the healthy eye, D and A are always in a state of equilibrium, since an increase in dissociation will always be compensated for by a corresponding increase of assimilation. This process by which A remains in unstable equilibrium to D is called adaptation. This state of equilibrium ends when the quantity of light reaches a certain height, for the process of assimilation has an upper limit, because the secreting power of the pigment epithelium or, in other words, the production of the visual substances cannot increase indefinitely. There is then an upper margin, at which the process of A is still able to supply the loss resulting from D.

There is then adaptation to increasing as well as to diminishing light, and a margin or limit of adaptation for

brightness. It is at this upper margin that the maximum perception of least differences is reached. If light increases beyond this point, fatigue follows, and the perception of least differences diminishes. This point is called the absolute fatigue limit where adaptation is impossible, in distinction from the zone of relative fatigue where dissociation may still be made good by assimilation.

Opposed to the upper limit of adaptation, which naturally is not a subject for ordinary examination, there corresponds the lower limit of adaptation to darkness which coincides with the threshold of perception. Fechner distinguishes between the thresholds of excitation and of least differences. The absolute threshold of excitation which is not discoverable by ordinary methods, forms the absolute limit of repair. We always determine, however, the relative threshold—that is, the least stimulus relatively to visual angle and contrast of the object seen. By repair (Erholung) I understand the reconstruction of the A substance so that it equals D (relative repair), or so that A exceeds D (absolute repair). In the zone of absolute fatigue D is always greater than A, in the zone of absolute repair A is always greater than D. Between these extremes lies the range of adaptation; this is composed of those degrees of light and darkness to which the eye can adapt itself, upwards and downwards. Within the limits of this range, the sensitiveness of the healthy eye remains nearly constant.

Adaptation to brightness, then, means only adaptation to increasing light, and adaptation to darkness, to diminishing light, and the degree of light at which adaptation begins is entirely secondary. The healthy eye, then, can within certain limits always renew itself by an assimilation corresponding to the dissociation.

The movement inwards of the retinal pigment during the action of light protects the visual substances in the rods or cones from too rapid and complete transformation, and regulates the change of A to D. The advance of the pigment is in relation to the quantity of light. Guglio finds that this change takes place more rapidly when the change from darkness to light is sudden, and that the advance of the pig-

ment is most marked in the central part of the retina. The return of the pigment in diminishing light takes place comparatively slowly, and in darkness, after a certain time, the pigment remains in the outermost position.

The movements of the pigment are influenced chiefly by the wave-lengths of the light, most by short-wave blue light, less by green, still less by yellow, and not at all by red light, and this corresponds to the statements of Boll and Angelucci with regard to visual purple.

The range of adaptation for monochromatic light is narrower than for white light, but the range and adaptation for the different colored lights is not the same. The sensitiveness for light of long and short wave-lengths does not increase equally in proportion to the quantity of light. With increasing intensity the sensation increases at first more rapidly, later more slowly, for blue and violet than for green, and in the same manner for green as compared with red (Nicati, Butz, Uhthoff). The maximum of sensation is reached for blue with less light than for red; with a greater intensity blue loses its specific tone, while no change is noticed in red. The maximum of sensation, then, is reached with a lower intensity in light of short wave-lengths than in that of long wave-lengths. The reverse is true in diminished light; blue is brighter, red is darker (Purkinje's phenomenon).

If color thresholds are to be determined, it is necessary to distinguish between the specific and the absolute. The specific threshold is determined by the least degree of light with which a pigment just gives an impression of color; the absolute threshold is the degree of light with which the colorless sensation of the pigment is just visible. The specific threshold is much more difficult to determine than the absolute and will always be given variably by different observers, not so much because of differences in the color sense as because of differences in experience with colors.

Both light sense and color sense are different in centre and periphery, and in this connection it is important to remember that by centre is meant the fovea and not the macula.

There follow eight tables giving the results of the author's examination of his own slightly myopic eye, in which the absolute and specific thresholds for white, gray, and colored objects of different sizes centrally and peripherally for daylight and diminished light are determined.

Among the results obtained are the following: The absolute (colorless) field for blue and the field for white are wider in the adapted eye, with diminished light, while the absolute limits for red are narrower than with daylight. With diminished light, in spite of adaptation, the specific limits are notably narrowed, the blue more than red. Colors are brightest in a zone of 10° to 15° around the fovea, but in the centre itself, even by daylight, pigments seem darker and deeper toned. This difference between the periphery and the fovea is still more marked with diminished light, the light sense and especially the blue sense being relatively lower in the latter. In other words, in the normal eye the fovea is night-blind and blue-blind as compared with the periphery. In the periphery, blue, with gradually diminishing light, passes into a neutral gray, equivalent to a mixture of 90° white with 270° black (absolute sensation). The specific sensation, however, diminishes so rapidly that while the limit of the absolute sensation—which is only slightly narrower than white—is but little contracted, there is no longer a sensation of blue in the field. The same result is obtained by the use of progressively smaller objects with a constant, moderately diminished light. In the fovea, with gradually diminished light, blue becomes darker—ultramarine, indigo, blue-black—until it passes into black, while it is still "light gray" in the periphery. As red is still recognized centrally after blue has passed into black it may be said that Purkinje's phenomenon does not exist for the fovea centralis.

If the neutral gray (90° white + 270° black) into which blue passed peripherally is taken, its peripheral limits will be the same as the absolute (colorless) limits of blue, but centrally the same gray object, while darker than it was in the periphery, is considerably lighter than the black impression produced by blue. There follows a brief discussion of the

various methods in use for testing the central and peripheral light sense, and a summary of the views of other observers, more or less conflicting. Finally allusion is made to certain other factors favoring adaptation: The pupil (Schirmer), individual differences in the position of the eyes, and the action of the lens in absorbing in proportion to its fluorescence the rays of short wave-length. If the lens is absent in an eye capable of sufficient repair of the used-up blue substance, there will be an increased blue sensation, and Widmark and Chardonnet have found in aphaxia an increase of the violet end of the spectrum, and cases of subjective blue vision following cataract operation have been reported. If, on the other hand, repair is not adequate to maintain the equilibrium between D and A, there follows an excessive consumption of the blue substance and red-yellow vision (erythropsia). A similar function belongs to the retinal pigment, and especially to the yellow pigment of the macula. Accommodation and the movements of lids and eyes, by improving the nutrition of the eye by means of increased currents of lymph and blood, also aid in the process of assimilation.

PATHOLOGICAL PART.

In affections of the optic nerve, there is nyctalopia (day blindness) and diminished perception of red; in chorioretinitis, on the other hand, hemeralopia and depressed blue perception, both central and peripheral. The latter symptoms are characteristic also of fatigue or anæsthesia retinæ, and are symptoms of retinal inferiority, functional or organic. In order to detect slight degrees of delayed adaptation, it is necessary to determine the threshold by means of Förster's photometer, promptly, in the early stage of adaptation and again after ten or fifteen minutes' darkness, when adaptation should, in the healthy eye, be complete; five minutes is enough time, however, to enable the average healthy eye to recognize the details at the back of the photometer with the normal opening. The instrument, as Wilbrand has remarked, gives no information as to a definite part of the retina, but measures merely the total threshold. To differentiate be-

tween the different parts of the retina, the threshold must be determined in the dark room with the perimeter.

The condition of the hemeralopic eye is the same as that of the normal eye previously described, only exaggerated, as the normal fovea is hemeralopic, as has been seen. The threshold is higher in the centre than in the periphery and the threshold for blue is higher than for red. Even in daylight hemeralopic patients will often state that the central object is darker than the peripheral. Often, at the centre, blue will appear greenish and yellow reddish; bright green may seem gray, while red remains unchanged. In general, the perimetric examination, with objects of different sizes and with varying light, corresponds to Wolffberg's method, which is that a normal eye should see a blue square of seven *mm* diameter at the same distance as a red square of two *mm* diameter, except that Wolffberg measures the threshold in its relation to the visual angle, while I measure it in its relation to the degree of light. It is easier, moreover, to control the fixation with the perimeter, a matter of the first importance, as the point to be determined is the comparative sensitiveness of fovea and periphery. In the periphery, also, the blue sensation is depressed in the hemeralopic eye, the absolute or specific limits, or both, being contracted in proportion to the degree of inferiority.

[An attempt is next made to determine the threshold for different colors in a darkened room, to which daylight is admitted through a modified Aubert's diaphragm; but, as Cohn has shown, the variations of the quantity and kind of daylight are so great and so rapid that other more constant sources of light must be used to produce constant results. Moreover, the luminous intensity or light value of the colors is too uncertain and has been hitherto too difficult to determine to admit of an exact comparison. But the relations between the different findings in a given case are important and the results are compared with the known conditions of the examiner's eyes.—*Translator.*]

The results of the examination of the threshold for blue and red may be stated as follows:

1. Threshold for red not raised, for blue slightly raised,

so that both are equal, indicates slightly delayed adaptation in disease of the outer layers of the retina.

2. Both thresholds equally raised or blue higher, then red shows a more marked interference with adaptation in disease of the retina.

3. Threshold for blue not raised, but red high, shows disease of the optic nerve without disorder of adaptation.

4. Both thresholds raised, with red higher than blue, points to disease of the optic nerve complicated with disorder of adaptation.

Nyctalopia is a sign of fatigue and is characterized, aside from a lessening of the perception of differences, by the sensation of shimmering. It occurs in the normal eye following sudden changes of light as a temporary condition, and constantly when the eye is exposed to light which is beyond its limit of adaptation to brightness. Partial nyctalopia (so-called photopsia and shimmering) occurs especially in acute organic disease of retina and choroid, in the neighborhood of relative, positive scotomata, that is, of circumscribed areas which are impaired in function (Unterwerthig). Förster[1] mentions several classic examples. The shimmering area always corresponded to a defect in the field. Nyctalopia is present in other cases in the form of photopsia: "bright, transparent spots, discs, or rings, or oval figures which swing or rotate with quivering rapidity" (Förster). Nyctalopia is most marked, however, in diseases of the optic nerve. Chromatopsia, alternations of different color sensations, are symptoms of fatigue also, and are analogous to nyctalopia and shimmering, with colored lights.

Subjective color sensation is due to exhaustion of one or more of the visual materials for color; for instance, in a hemeralopic eye, those for the short wave-lengths, while the long wave-lengths are still capable of stimulation and sensation. Thus to such an eye everything appears more red or yellow than normal. In a picture gallery it is possible to distinguish the paintings of myopic artists by their warmer color-

[1] *Graefe's Arch.*, xx., 1, p. 52.

ing. Angelucci[1] in an attempt to solve the question raised by Liebreich as to the so-called senile manner of aged painters, found that among one hundred persons between sixty and eighty years of age, vision was reduced in 62.85%; light sense in 86.1%; in 34% there was hemeralopia, and difficulty in recognizing violet and blue was present. Colors are seen by a hemeralope as if a yellow glass were held before the eye.

For information concerning the occurrence of anæsthesia retinæ and hemeralopia the reader is referred to the author's book, *Ueber Hemeralopie*, and the subject will be dealt with more fully in the second and third parts of the pathological division of this work. Here only a few instances are mentioned.

Spasm of accommodation may follow the same causes which produce hemeralopia—dazzling, snow blindness, "electric ophthalmia" in a case caused by lightning *(Krienes, Beiträge z. d. Verletzungen des Auges)*, acute cyclitis and irido-cyclitis; or spasm occurs primarily following near work, and as a result there is anæsthesia retinæ.

It is known that during accommodation the field of vision becomes wider and during relaxation narrower, and it is clear that the circulation in the choroid is enhanced by changes of accommodation. If the ciliary muscle suffers from spasm or paresis, the nutrition suffers and with it the repair of the visual substances. We find, therefore, the symptoms of anæsthesia retinæ associated with spasm of accommodation. Müllerschein[2] describes a tonic spasm and one which occurs only with "the intention to see" or better a clonic spasm associated with insufficiency of accommodation. This latter form is part of the picture of nervous asthenopia which has been well described by Wilbrand,[3] and which may be compared to the occupation neuroses caused by overwork, in a weakened muscle. A few cases of anæsthesia retinæ have been observed in this condition, and more would undoubtedly be recognized if adaptation were studied as has been described.

---

[1] "La Funzione Visiva dei Vecchi," etc., *Arch. di Ott.*, ii., p. 3, 1894.
[2] "Beitr. z. Lehre d. Accommodationskrampfes," *Inaug. Diss.*, 1888.
[3] *Ueber Sehstörungen bei functionellen Nervenleiden*, 1892.

In myopia, the chronic disturbance of nutrition of the choroid and lack of pigment cause the same symptoms, attributed to interference with adaptation. Wolffberg and Samelsohn substantiate this view while Raehlmann claims that in myopia the field of vision for white and colors is larger than in emmetropia. [That myopia may not be accompanied by hemeralopia, even where the condition is most favorable, is shown by the case of Karl Hauer, reported by me in these ARCHIVES, vol. xxiv., No. 3, p. 316.— *Translator.*]

Then follows a description of ten cases, for the details of which the reader must be referred to the original. A brief abstract of certain of these, however, may be allowed.

CASE 2.—Anæsthesia retinæ from myopia and continued near work: An example of central fatigue, the periphery being much less affected. The field of vision with diminished light soon became as wide as by daylight, but the central threshold, especially for blue, remained much raised as compared with that of the observer.

CASE 3.—Seamstress, brunette, well nourished, not neurasthenic. Complains of dazzling, flimmering, and cloud in bright light and snow. On entering a dim room everything is dark at first, then she sees an oval red spot which lasts a few seconds and becomes bright green, lasting one or two minutes. By moving the eyes and winking, the colors disappear sooner. Work and reading quickly cause fatigue.

Myopia of 3 D and 5 D. Insufficiency of internal recti.

In this case adaptation with the photometer was delayed. In diminished light blue was seen as green when it should have been recognized, but after a period of adaptation was correctly named. With the perimeter, the limits were much narrower for blue than normal, and centrally a blue square of *2 mm* was seen as black even after ten minutes' adaptation.

CASE 5.—An example of hemeralopia or anæsthesia retinæ after cataract operation; with erythropsia, etc. "D-fatigue, or excessive dissociation." $V = \frac{8}{10}$. Twelve days after the operation, red vision began and lasted two and one half days, becoming rose-colored and somewhat violet. Only noticed in bright places. At the same time the vision was much impaired in dim lights, the hemeralopia and erythropsia diminished and disappeared together. Eight days later the same symptoms returned for one day. During these attacks he noticed that blue objects seemed black.

The total threshold with the photometer was much raised and adaptation delayed. Blue with slightly reduced light seemed black, by daylight the blue limits were within the red. With less light, the examination with a large white square showed that the threshold was highest in the fovea, then in a macular, intermediate zone (Wilbrand), and lowest in the periphery.

Later, while there was no erythropsia, a lesser degree of anæsthesia retinæ persisted.

Case 6.—An example of "A-fatigue," or imperfect assimilation, in contradistinction to the last case. During each of her eight pregnancies, she has suffered with hemeralopia, from the fifth month. While she at other times bears bright lights well, during these periods the sunlight and white walls and paper are dazzling. Twilight is much more agreeable. On entering a darkened room, she sees at first as through a tube. Bright objects appear reddish, but there is no green vision. One child is said to have retinitis pigmentosa. She is moderately well nourished. No albumen; six months pregnant. In the fundus there are signs of œdema of the retina. V = $\frac{20}{40}$, and $\frac{20}{30}$. With the photometer, after considerably prolonged adaptations (25 minutes), as compared with the normal eye, the threshold became normal. Blue was less well seen also after adaptation. The field for white was moderately narrowed. Most of all that for blue.

Case 8.—An example of spasm of accommodation with hemeralopia, erythropsia, and chromatopsia; neurasthenia; irregular or unevenly distributed peripheral fatigue.

Max S. Age twenty-seven, photographer. Vision good until 1891. No syphilis. Ocular symptoms increased gradually until 1895; during that winter he worked excessively, facing a window opposite a white wall, and often all night. Neurasthenia developed and vision diminished; sustained work became impossible. Flimmering in daylight, dazzling (nyctalopia); hemeralopia and erythropsia. His patrons said, "He paints people's cheeks too red," and he replied, "Everyone looks so healthy."

General condition good except for neurasthenia. Pupils normal. Fundus normal. Vision, $\frac{20}{40}$; — 6 D = $\frac{20}{30}$. With the ophthalmoscope, My. = 1 D. V with Seggel's light sense cards by daylight and reduced light, diminished.[1]

The photometer showed adaptation to be delayed and the total

[1] Krienes, "Ueber Adaptation und Adaptationsstörungen," p. 150. Festschrift zu Ehre von Professor R. Förster, 1895.

threshold raised. Blue was seen badly or not at all with diminished light. Examination of the field of vision by daylight showed a marked fatigue displacement of the Wilbrand type.[1] (Fig. 1, Plates xxii.–xxiii.)

For red 5 *mm* and blue 5 *mm* test object (Fig. 2, Plates xxii.–xxiii), both reduced blue relatively more than red. By diminished light after ten minutes' adaptation, small colored objects were not seen ; the field for blue 20 *mm* was narrowed to a small area below fixation point, that for red, 20 *mm* (Figs. 3 and 4, Plates xxii.–xxiii.), being similar but extending farther upwards. After four weeks' rest and tonic treatment, and ten days in a dark room, the myopia diminished to 2.25 D. Adaptation was still delayed, but the total threshold was normal. Field for blue still narrowed, but after ten minutes' adaptation, normal. The notable features of this case are the marked spasm of accommodation with hemeralopia, followed by less spasm with anæsthesia retinæ ; the improvement of the eye symptoms being independent of the continuance of the neurasthenia ; the marked fatigue of the lower part of the retina, large blue and red objects being seen only downwards, by the upper part of the retina.

[1] Norris and Oliver, *System of Diseases of the Eye*, vol. ii., p. 309.

COLOBOMA OF BOTH OPTIC NERVES WITHOUT COLOBOMA OF THE UVEAL TRACT.

By Prof. F. HOSCH, Basle.

Abridged Translation by Dr. Ward A. Holden.

(*With two figures on Plate II. of Vol. XXXIV. Germ. Ed.*)

AMONG the isolated colobomas of the optic nerve those are of the greatest interest in which the enlarged and excavated optic disc is surrounded by a broad scleral ring, and the retinal vessels appear in the disc already divided but arranged regularly about the centre. This is the rarest variety of coloboma of the optic nerves and only ten cases have been reported.

My patient was a very anæmic girl of eighteen who consulted me on account of myopia. She had not previously been examined by an oculist. Apart from her anæmia the patient had never been ill, and had never had trouble with her eyes. No congenital anomaly was found elsewhere in the body. Her parents were not related by blood nor were they myopic. Her brothers and sisters have good vision.

Externally the eyes appear healthy. There is no sign of strabismus, nystagmus, or photophobia. The irides are brown, the pupils of normal size and reaction. Intraocular tension normal. R: with -5, V$=\frac{8}{200}$; L: with -2.5, V$=\frac{4}{10}$. R. Jaeger No. 16, when held very near. L. Jaeger No. 1, at 11 *cm.* Color sense normal. Visual fields normal except for some enlargement of the blind spots. Media clear.

In the right eye the optic disc is enlarged to two or three times its natural diameter. It is of oval form and sharply

outlined. It is bordered by a yellowish ring ½ Pd. in diameter, with a line of pigment at its inner margin. Upward and inward from the disc (in the inverted image) is a roughly quadrilateral area in which the retinal pigmentation is diminished. (See Plate II.)

The disc appears deeply excavated with a margin partly overhanging, and it has none of the stippled appearance usually produced by the lamina cribrosa. It has a grayish-red hue and is somewhat lighter in the centre. About this lighter centre ten to twelve small vessels emerge and extend out into the retina. Arteries cannot be distinguished from veins.

The left fundus is similar. The disc in this eye is somewhat larger and less regularly oval and its margin below is more overhanging. The light scleral ring is similar to that in the other eye, but the line of pigment representing the choroidal ring is less complete. The anomalous vessels are here about thirteen in number.

There have been differentiated three sorts of coloboma of the nerve or nerve sheaths, according to the behavior of the inferior fœtal cleft in the nerve, through which the central vessels enter. 1. The cleft may not close at all, and then the central vessels will appear at the lower margin of the disc, and the latter will slope downward and backward. 2. The cleft may close in its central portion, and then the vessels may have a normal arrangement or may come out at the lower margin of the disc, but in a more regular manner and less scattered than in 1. 3. The inferior margins of the cleft may unite leaving the centre open for a time. The final result then will be a large, deeply excavated disc with a number of small vessels emerging in a circle about the centre of the disc, as in the case here recorded.

Explanation of the figures on Plate II.—Both drawings were made in the inverted image, somewhat enlarged.

PROGRESSIVE PARALYSIS OF THE LEVATOR.

By Prof. P. SILEX, Berlin.

Translated by Dr. Matthias Lanckton Foster, New York.

PROGRESSIVE paralysis of the levator is a very rare disease, which seems to be unknown to most neurologists and ophthalmologists. The only article on the subject that I have been able to find is the one by Fuchs, and although it is possible that it has been treated of by some foreign writers, I have not been able to find any reference to such an article. It has not previously been shown here in Berlin, unless I am in error, and during the past six years I have found only two cases among the 80,000 patients which have come under my observation. One of these seems to possess enough of both practical and general medical interest to be worthy of report, and possibly also this contribution may serve to direct attention to this peculiar affection and so be productive of a better knowledge regarding it.

Fuchs described five cases, two from his own practice, one each from that of Obersteiner, Kahler, and Bergmeister, and it is noteworthy that all the patients were women. In three of the cases the histories were very similar. The patients were forty-nine, fifty-six, and sixty years of age respectively, had always enjoyed good health, were non-syphilitic, had no hereditary predisposition, and the ptosis was the only physical fault to be found in their bodies. This had developed so gradually that the time when it began could not be ascertained with certainty. During the first stage of the disease the levator would lift the lid several milimetres, while the occipito-frontalis would be called upon to supplement this

action, but it slowly progressed until at length there was complete paralysis of the levator. In each of these three cases the ptosis was the more marked on the right side, and its intensity varied according to the mental condition or the physical weariness of the patient. The left eye could be sufficiently opened to permit of vision, so that only one patient carried her head thrown back in the position characteristic of ptosis. "The brow was constantly wrinkled, and the energetically raised eyebrows gave the face a comical appearance of astonishment." The lids were lengthened vertically and attenuated, partly on account of this elongation, but more as the result of an atrophy of the tissues in the neighborhood of the levator, which also produced a deep depression of the skin beneath the orbital margin.

Fuchs then described two atypical cases, both in women, one of thirty, the other of sixty years of age. The latter gave a family history of ptosis covering three generations and in six members of her family. In the other, hereditary predisposition was also present; the ptosis was present in childhood and increased in later years.

Both of my patients were women, sixty-two and sixty-eight years of age, who had never been seriously ill, were not syphilitic, had been married, had borne healthy children, felt, in spite of their age, well and cheerful, and gave no history of a hereditary predisposition. Briefly, the conditions they presented coincided in almost every point with those of the first group described by Fuchs.

The elder patient has been lost sight of for about a year, and in regard to her I will simply state that at that time her ptosis had existed about six years, and that her levators still retained some contractile power, so that the left palpebral fissure measured four millimetres, the right five.

The other, sixty-two years of age, had noticed for four years a progressive drooping of both upper eyelids, particularly of the left, until finally they could be raised in the morning only with the aid of the hands. The eyes were freely movable, and all the other organs of the body were normal. The vision of the right eye was $\frac{6}{20}$ with -4 D, that of the left eye $\frac{6}{30}$ with -2 D, a result which could be

obtained only when the head was thrown far back, a position so uncomfortable that the patient discontinued it when walking in the street or when she was in a room. The myopia dated from childhood. Medullated nerve fibres could be seen below the left papilla. When the occipito-frontalis was exerted to its utmost, the left palpebral space was scarcely three millimetres, the right four millimetres wide at its widest part, and it was doubtful if the levator retained the least activity. The stretching of the skin of the lid and the deep depression beneath the upper margin of the orbit, mentioned by Fuchs, were present, together with a condition not mentioned by him, fear on the part of the patient that she would become blind. The essential feature of the case is that in an otherwise healthy woman the levators were affected by a progressive disease which resulted in total paralysis.

This case has more than a passing interest when we consider that it may aid in answering the question whether the demonstrable changes in this disease occur as a result of a disturbed nervous influence, or are produced by a primary nutritive derangement in the muscular tissue, *i. e.*, whether the lesion is one of the nervous or of the muscular system.

The theory that a trophic neurosis dependent upon disease of the sympathetic is the cause of progressive muscular atrophy has now been abandoned. Authorities are almost equally divided in ascribing the cause of this disease to nervous and to muscular lesions. Progressive muscular atrophy certainly does not appear to be the same as progressive paralysis of the levator, because in the former the muscles of the body are involved, not simultaneously and throughout their whole extent, but singly and piecemeal, with a gradual extension over the greater part or the whole of the muscular apparatus, while in the present case only two muscles had become involved after the lapse of years. The lingering course, the frequent symmetry of the affection, the absence of a neural paralysis, the absorption of fat in the region of the muscles, and a degree of atrophy corresponding to the impairment of function, are common to both. As regards the muscular reaction of the levator to the electric current, nothing can be determined on account of its position.

Most writers are of the opinion that there are two forms of muscular atrophy, the atrophia musculorum or amyotrophia spinalis progressiva (Duchenne-Aran), and the primary progressive myopathy. Under the former name several diseases are united, such as amyotrophic lateral sclerosis, from which this case is excluded by the absence of spastic phenomena; chronic anterior poliomyelitis, an atonic, rapidly appearing muscular paralysis followed by degeneration, in which a number of muscles, such as an entire section of a limb, are always involved from the beginning; gliosis of the spinal cord, which is associated with trophic changes in the skin and changes in the sense of feeling; hypertrophic cervical pachymeningitis, in which there are prominent symptoms of irritation; caries of the lower cervical vertebræ, which, aside from any other symptoms, presents sensitiveness to pressure over the vertebræ; atrophy due to occupation and that associated with arthritis. As a result of the researches of Charcot and his followers, most authors at the present time believe that these forms of progressive muscular atrophy originate from a spinal lesion which involves the gray matter of the anterior horns, the anterior nerve roots, the nerves that supply the muscles, and the muscles themselves. Histologically, in the latter there is a diminution in the size of the fibres, a destruction of their contents, and a mass of granular and fatty material, after absorption of which there remain only sarcolemmas filled with nuclei.

In the second group, under the name of primary myopathy, or dystrophia musculorum progressiva, are classed nutritive disturbances dependent on idiopathic muscular disease, which cause hypertrophy, and juvenile, hereditary, and infantile atrophy. These are even yet sometimes described as separate forms of disease, but should rather be considered as a single affection on account of their clinical and anatomical unity. In this disease atrophy appears in only a part of the muscles involved, while in the balance there is a greater volume as the result of an increased growth of fat and of connective tissue. The participation of the orbicularis betrays itself by an imperfect closure of the lids, which may sometimes result in lagophthalmos. Examinations of pieces

of tissue excised from the living and from the dead body, demonstrate that an increase of the fat and of the connective tissue can occur either alone or together; sometimes fat is very plentiful between the fibres, while at other times the increase of fat is absent and there is only an abundant fibrillary connective tissue between the fibrils. As they undergo a simple progressive atrophy the muscular fibrils become thinner and more slender, until finally the sarcolemma alone remains, but it should be noted that all the primitive fibres are not equally involved. Occasional conditions which are met with are longitudinal disintegration with loss of the transverse striæ, transverse segmentation and parenchymatous cloudiness, waxy hyaline degeneration, fatty degeneration, augmentation of the muscle corpuscles, the formation of vacuoles, and frequently the occurrence of hypertrophic fibres between the atrophic ones. Although very careful observations have been made, no involvement of the ganglion cells of the anterior horns, nor of the anterior nerve roots, nor of the peripheral nerves, has as yet been demonstrated, so it is clearly evident that this group of diseases is purely muscular.

The frequent occurrence of such forms of atrophy as the simple, the fatty, the waxy, and the pigmentary, is considered by many to be characteristic of the neuropathic variety, while in primary myopathy the presence of hypertrophic muscular fibres and the striation of the muscle with connective tissue and fat is likewise thought to be characteristic, but hypertrophic fibres were found by Hitzig in spinal infantile paralysis, which is certainly of neuropathic origin; and if we study the reports of the numerous necropsies which have been made, it becomes very evident that a differential diagnosis between the neuropathic and the myopathic forms of muscular atrophy cannot be made with certainty by means of a microscopical examination of the muscle.

In this patient the history of the disease did not accord with the ordinary varieties of paralysis of the levator. The protracted course, the trace of contractility which possibly remained in the muscle, the atrophy of the skin and of the

fatty tissues, together with the circumstance mentioned by Fuchs, that in some cases there was a history of a slight degree of congenital ptosis,—all indicate that the lesion is a slowly progressive atrophy of the levator. It was therefore very desirable to obtain a portion of this muscle for examination, the more so since Fuchs says, at the end of his article, that this condition cannot be classed with any known form of muscular atrophy. Accordingly, after the patient had been placed under general anæsthesia, an incision was made through the skin beneath the supraorbital margin, the tarso-orbital fascia was divided, the muscle exposed, a portion of it elevated on two strabismus hooks and then excised. It is self-evident that this was done deep in the orbit. It occurred to me that it would be rational to suture the tendon to the stump of the muscle, but after consultation with the five or six of my colleagues who were present, I abandoned the idea, removed an oval piece of skin from the lid, united the margins of the wound, and obtained a result with which the woman is still greatly pleased. There was no reaction after the operation.

Macroscopically there was nothing especial to be noticed about the muscle. The color was the same as that usually seen in the other eye-muscles, and as to its size, lack of experience in viewing the levator in the orbit of a living subject renders me unable to state whether it was broad or narrow.

The excised portion of the levator was hardened in Müller's fluid and in a solution of picric acid and corrosive sublimate, stained with hæmatoxylin and eosin, and examined, partly in this condition, partly unstained in glycerin. The examination showed :

1. A marked striation of the muscle with fat and connective tissue.

2. Rarely a good transverse striation of the muscular fibres, but frequently, instead of this, a fine longitudinal striation, and often a finely granular degeneration.

3. Great differences in the breadth of the fibres, which varied from six to one hundred and ten microns. The broad for the most part outnumbered the narrow fibres,

and the different ones were separated by abundant connective and fat tissue. The nuclei were not extremely, but yet decidedly, augmented, as compared with those of the normal muscle fibres, and they varied considerably in form: some were egg-shaped, some spindle-shaped, some large, and some small.

The contractile substance was often fragmentary, and presented clefts and fissures, so that here and there the empty sarcolemma alone remained. On transverse section a space filled with serum occasionally appeared between the shrivelled muscle fibres and the sarcolemma. Large accumulations of red-blood corpuscles in the loose connective tissue between the muscle fibres were probably due to hemorrhages caused by the excision.

In order to determine how far these conditions are to be considered pathological, portions of normal levators taken from individuals of eighteen, forty, and seventy-five years of age were examined. This examination showed that:

1. In the eighteen-year-old girl, the muscle fibres lay close together, were from ten to twenty microns broad, the visual field of a Zeiss D. Ocul. II. contained about twenty when placed longitudinally; the nuclei were scanty, moderately large, and egg-shaped.

2. In the forty-year-old man, the fibres were from fifteen to thirty microns broad, the visual field contained about fifteen fibres, and the nuclei were somewhat more numerous than in No. 1.

3. In the seventy-five-year-old man, the breadth of the fibres was from seven to fifteen microns, the visual field contained about thirty fibres, and the nuclei were more numerous than in Nos. 1 and 2.

In all three the fibres were clearly marked transversely, and the intermuscular connective-tissue was very slight.

While the result of the examination of this case of atrophy agrees partially with that published by Fuchs, it differs in these important particulars: he did not find any hypertrophic fibres the diameter of which greatly exceeded thirty microns, or any considerable increase of the connective tissue, or the permeation of the muscle with fat, and I did

not see the pigment mentioned by him, unless it may have been in the blood clot. In all other respects our observations agree.

What conclusions are we entitled to draw? Like Fuchs, I think that we have to deal with a primary atrophy of the levator, but I cannot agree with him that it is not to be included among the known forms of muscular atrophy. At the time of its removal he could not positively declare that the portion he excised was a part of the muscle; he cut out a little bit from a strong cord which he found extending forward, and perhaps the examination of a larger piece of muscle would have given him different results, but then again perhaps not. It may be that he is right in his opinion; further researches will determine that, but I think that this is a primary myopathy, dystrophia musculorum progressiva, for the histological condition I found is almost exactly the same as that of this disease as it has been described many times by neurologists, and since they have been unable to prove the presence of nerve lesions in numerous diseases of the muscles of the body, we need not fear to fail to do so in an isolated case of degeneration of a muscle of the eye. It is right to ignore for the present the fact that by means of a more perfect technique changes in the nervous system may, at some future time, be proven to be present in the so-called myopathic degeneration.

One is apt to conceive of this disease as a special form of congenital ptosis, particularly in those cases in which its beginning is said to have occurred in youth, and to think that the muscular trouble may present the first traces of the hereditary form of muscular atrophy; but the limitation of the disease to the levator is opposed to this view, because such a limitation does not occur in any other form of muscular atrophy, and in addition the histological condition is not the same as in congenital ptosis.

I had an opportunity to examine a portion of a levator taken from a twenty-seven-year-old woman upon whom I performed Panas's operation for congenital ptosis in January, 1895. She returned in March, 1896, with the lid greatly enlarged and drooping so that the globe could not be seen.

The freely movable, apparently normal skin covered a tumor about as large as a pigeon's egg, of irregular shape and soft consistence, which was at first thought to be a lipoma, but proved to be a cyst with pulpy, in places honey-like, contents, and with a very delicate wall of cellular tissue covered with two or three layers of pavement epithelium. This case is interesting on account of the peculiar outcome of Panas's operation, which up to the present time is unique and because, as the cyst was developed from a hair follicle, it furnishes positive proof of the existence of hairs in the skin of the upper eyelid, a fact which has been disputed, but which I have repeatedly demonstrated on patients who had been operated on by others for entropion by the transplantation of flaps, either with or without pedicles, and who have later applied to me for relief from the irritation of the cornea by the little hairs in the beautifully healed flaps. Together with the cyst I removed a piece of the levator, a proceeding I believed to be justifiable because no trace of functional activity could be detected in the muscle. A portion of the skin of the lid was removed at the same time, which gave a cosmetic result satisfactory to the patient.

The microscopical examination of this muscle showed a uniform atrophy. The fibres were in a state of total connective-tissue degeneration, transverse striæ could not be found, the nuclei were numerous, spindle-shaped, and interspersed with fat and connective tissue.

As the conditions found in progressive paralysis of the levator and in congenital ptosis are so essentially different, it may be well to study them in connection with each other, especially with regard to the cases in which heredity and the beginning of isolated progressive paralysis in childhood has been established. Gowers, speaking of congenital ptosis, says that a slight double ptosis sometimes occurs in several members of the same family, that this may appear after the age of puberty, and that a slight double ptosis sometimes appears in middle age in neurasthenic individuals. Goldzieher saw a double ptosis develop in a healthy individual, and thought that it might be due to disease of the levator. Ptosis happens from paralysis of the sympathetic, trauma-

tism, and hysteria, but the form of most interest is the congenital, and whether this is due to an absence, a faulty development, or an atrophy of the levator, or to a nuclear disease in the oculomotorius, is a question which still awaits an answer. Probably the cause is not always the same. Siemerling found changes in the oculomotor region in congenital ptosis, but their situation did not agree with the centres claimed by others for the levator, which is placed by one in the most anterior part, by another in Westfall's group, and by a third at the distal end of the oculomotor nucleus. Kölliker and Bernheimer could discover no anatomical lesion which corresponded with the clinical and physiological condition, and Bach could find no changes in his experiments regarding the extirpation of the muscles of the eye, or post mortem in a case of congenital, hereditary ptosis.

Sometimes the muscle is badly developed, and then it acts though to a very limited degree. If the lid is slightly raised when the eye is turned upward, it may have been through the connection between the superior rectus and the levator; but if it is raised in the absence of any such associated movement of the eye, the ptosis must be due to weakness of the levator, and the oculomotor nucleus must be intact. If the lid remains immovable, the muscle may be wanting, may be atrophic, or changes may have occurred in the nuclear region. A combination of these conditions is possible and we are usually not in a position to make the diagnosis clinically, but this is certain, that a muscular degeneration occurs, both with no observable change in the nervous system and also in consequence of such a change. The first is a primary atrophy, the second is secondary from central lesions.

Bilateral paralyses of the levators alone have been met with in tabes and progressive paralysis, as in the case reported by Dujardin, but usually other muscles, as the superior rectus and the inferior oblique, are simultaneously affected. A minute nuclear lesion may affect a single muscle, as in ophthalmoplegia interna, but usually through extension of the lesion other muscles become involved, as is the rule in peripheral paralysis, and that sometimes in ophthalmo-

plegia interna there is no extension of the paralysis is explained by the isolated blood-supply of the nuclear field.

In this case a peripheral paralysis is excluded by the absence of involvement of other muscles, a central paralysis by the fact that isolated nuclear paralyses appear suddenly or in a brief space of time, while all of these patients state that the ptosis came on very gradually, in the course of years. To maintain the neuropathic theory it must be assumed that on each side the groups of ganglion cells pertaining to the levator alone were destroyed in the slowest conceivable manner, and that this process spared all of the neighboring cells. This is very improbable, particularly as experience teaches that the levators are the least involved in ophthalmoplegia, so that often when the eyes are immovable there is only a moderate degree of ptosis. I therefore agree with Fuchs in the belief that this is a primary muscular degeneration, but instead of holding it to be sui generis, consider it a myopathic form of progressive muscular atrophy.

LITERATURE.

SCHULTZE, *Ueber den mit Hypertrophie verbundenen progressiven Muskelschwund und ähnliche Krankheitsformen*, Wiesbaden, 1886.

GOWERS, *A Manual of Diseases of the Nervous System*, vol. ii., p. 187.

EULENBERG, *Nervenkrankheiten*, 2 Theil, 1878.

FRIEDRICH, *Ueber progressive Muskelatrophie*, Berlin, 1873.

OPPENHEIM, *Lehrbuch der Nervenkrankheiten*, Berlin, 1894.

EULENBERG, *Realencyclopädie der ges. Heilkunde*, Bd xiii., 1888.

SEELIGMULLER, *Krankheiten der peripherischen Nerven*, Braunschweig, 1882.

FUCHS, E, "Ueber isolirte doppelseitige Ptosis," *Arch. f. Ophth.*, xxxvi., 1, p. 235.

FUCHS, *Wien. klin. Wochenschrift*, 1890, p. 13.

GOLDZIEHER, *Centralbl. f. Augenheilk.*, 1890, p. 94.

DUJARDIN, "Ptosis bilateral isole," *Jour. d. sci. méd.*, Lille, 1884, p. 16.

HITZIG, *Berl. klin. Wochensch.*, 1889, p. 629.

ERB, "Dystrophia muscularis progressiva," *Deutsch. Arch. f. klin. Med.*, Bd. xxxiv., 1884.

LETULP, "Zur Lehre von der Lage und der Function der einzelnen Zellgruppen des Oculomotoriuskernes," *Arch. f. Ophth.*, xli., Abth. 2.

SIEMERLING, "Anatomischer Befund bei einseitiger congenitaler Ptosis," *Arch. f. Psychiatrie u. Nervenheilk.*, Bd. xxiii., p. 764.

BACH, L. "Anatomischer Befund eines doppelseitigen angeborenen Kryptophthalmus beim Kaninchen nebst Bemerkungen über das Oculomotorius kerngebiet," *Arch. f. Augenh.*, Bd. xxxii., 1, p. 17.

REPORT OF THE TRANSACTIONS OF THE SECTION IN OPHTHALMOLOGY AND OTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE, APRIL 17, 1899.

By Dr. J. Herbert Claiborne, Secretary.

OPHTHALMOLOGICAL PART OF THE MEETING.

THE PRESIDENT, DR. PETER A. CALLAN, IN THE CHAIR.

The evening was devoted to the presentation of clinical material, and to a paper on the **use of the extract of the suprarenal capsule** in the diseases of the eye.

Dr. R. Denig presented a case of **traumatic enophthalmos** caused by a pistol-shot. Radiographs were taken with difficulty, owing to the copious salivary flow and enormous swelling of left palate. The bullet pierced the right orbit transversely, cut the optic nerve, producing hemorrhages and choroidal rupture, penetrated the left antrum of Highmore, and was finally arrested in the pterygoid process, whence it was removed with difficulty. Dr. Denig said that while the bullet wounds in the orbit were not rare, cases of enophthalmos in connection with them were rare. We would expect to meet more cases of enophthalmos in such wounds.

Dr. Percy Fridenberg spoke of some of the vessels going from the disc as being of normal calibre, and he thought this hardly possible unless the bullet had struck the nerve back of entrance of the central retinal vessels. He referred to a case in which he had used Roentgen rays.

The chairman referred to a case in which the autopsy showed that the bullet had not injured the nerves. He thought that hemorrhage into the orbit or fracture of the foramen opticum might cause similar ophthalmoscopic appearances.

Dr. E. GRUENING referred to a case of his in which the cutting of the nerve had taken place back of the entrance of the central vessels. Arteries and veins all looked normal.

Dr. H. KNAPP showed a patient in whom there was **complete restoration of sight after an operation by the Haab magnet.** The injury occurred in August, 1898. Two days after there was a scar in the cornea, and the track of the foreign body through the lens was visible. But the foreign body had disappeared in the vitreous humor. The Haab magnet having been applied, the foreign body was drawn forward, and the iris bulged. The foreign body was extracted with the magnet through a corneal section. Now the only thing visible is the perforation in the iris from the foreign body. The lens has cleared up, and the patient reads $\frac{20}{30}$ with + 2 D.

Dr. THOMAS R. POOLEY referred to the remarkable result: the clearing up of the lens in Dr. Knapp's case.

Dr. GRUENING said it was not infrequent that the partial cataract, which occurs as a result of touching the lens in glaucoma operations, clears up.

Dr. FRIDENBERG also spoke of a case of foreign body in the lens which did not cause any further opacification than that produced directly by itself.

The Chairman congratulated Dr. Knapp on his good result. The best result in his experience had been $\frac{20}{30}$; but the visual acuteness afterward became less.

Dr. KNAPP spoke of the clearing up of the rabbit's lens in ruptures after experimental wounds. He also spoke of the method of drawing the foreign body to the posterior pole of the lens, and then leading it around the periphery. He had tried this six times. He did not succeed in one case.

Dr. JULIUS WOLFF presented two cases of **congenital paralysis of one external rectus with retraction and protrusion movements of the eyeball.**

In his first case, a girl of nineteen, with weak mental and physical development, who suffered from headaches and hysteria, showed divergence of right eye of 15° or 20°. The eye could not be abducted. In attempted adduction, the right eye recedes into the orbit about 8 *mm*, and turns upward. The upper lid, lacking support, falls, so that the eye is almost closed. In attempted abduction, the eye moves forward, thus widening the palpebral fissure.

In the second case, a boy of five and a half presented a similar but less pronounced condition. Outward rotation beyond the middle line was impossible, inward rotation was much restricted, and accompanied by moderate retraction of eyeball and falling of upper lid.

In both cases the condition was congenital.

The cases will be published in detail in these ARCHIVES.

Dr. MARPLE presented a case of **congenital muscular anomaly** in a boy of twelve years of age. The head was always bent forward and to the left, as shown in a photograph taken at six years of age. Discussed by Drs. SEABROOKE and VALK.

Dr. T. R. CHAMBERS presented a case of **plastic operation for removal of a solid tumor at the inner canthus of the eye.**

Dr. E. GRUENING detailed the clinical history of a case of **corneal wound of the eyeball followed by sympathetic ophthalmia.** Dr. W. B. MARPLE gave the anatomical demonstration of the same case. Dr. GRUENING said the case was recorded because it proved that a purely corneal wound, with extensive prolapse of the iris, can under so-called conservative treatment induce sympathetic ophthalmia. He thought this termination would in all probability have been avoided by a timely excision of the prolapsed iris. The left eye of a child had been struck by a piece of glass, producing an incised wound of the cornea extending across the horizontal meridian. The iris was prolapsed in the entire extent of the wound. Excision of the prolapsed iris was suggested, but was refused by the parents. Atropine and a bandage were employed. Twenty-three days after the injury both eyes were affected, and the child saw badly. The cornea of the injured eye was hazy, the anterior chamber abolished, and pupil filled with exudation. The right eye was the seat of plastic irido-cyclitis. The cornea was clear, the pupil free, the iris discolored and immovable. The child was too restless for a view of the fundus. Dr. Gruening made an incision at the lower limbus of the cornea, and attempted to tear the iris away from the corneal wound. This was unsuccessful. The left eye was finally enucleated. The right eye was much damaged, and at the end of four months possessed visual acuteness of $\frac{1}{10}$. Dr. Marple's anatomical specimens showed that the incarceration of the iris had flattened the ciliary processes, lengthened the ciliary body, and drawn it into the anterior chamber.

Dr. POOLEY said the case only bore out the position taken by him in the recent discussion, viz., that freeing the iris in these cases was the proper procedure. He thought it useless to remove the injured eye after sympathetic ophthalmia has begun in the second eye. Dr. H. KNAPP said the case interested him very much as he had seen it a few days before enucleation. He said if the iris was not lacerated in this case it would be the first case in his experience in which sympathetic ophthalmia followed simple prolapse from corneal wound. He wished to know if the iris was lacerated. He had seen hundreds of such cases without sympathetic ophthalmia. He thought more evidence should be collected in order to reach a positive conclusion.

Dr. H. H. SEABROOKE referred to two cases—one of incarceration of iris. In this case there was sympathetic ophthalmia and both eyes were lost; another case: the injury was from a firecracker; there was prolapse. Several weeks afterward sympathetic ophthalmia resulted. The exciting eye had an attack of glaucoma. He had still another case in which the eye was enucleated two weeks after injury. Two years afterward sympathetic ophthalmia occurred.

Dr. KNAPP referred to the greater frequency of sympathetic ophthalmia after the combined than after the simple extraction of cataract.

Dr. W. H. BATES read a paper on the **use of the extract of the suprarenal capsule in diseases of the eye** (published in this volume of these ARCHIVES, No. 3).

In the *discussion* of this paper Dr. CHAMBERS wished to know the strength of the solution and how long it keeps. Dr. BATES replied that the strength was 1–10, and that if kept cold it would keep a long while.

Dr. J. O. TANSLEY had used it in the nose a good deal during the past year. He had also used it to get wax out of the ear. He had used it successfully in a case of acute catarrhal inflammation of the eye, after the use of ice applications. The discussion was closed by Dr. BATES.

MAY 15, 1899.

THE PRESIDENT, DR. PETER A. CALLAN, IN THE CHAIR.

The evening was devoted to the presentation of clinical material—cases and specimens—and to a paper on **strabismus.**

Dr. ARNOLD KNAPP showed five specimens of eyes enucleated

after **subchoroidal hemorrhage.** The specimens were imbedded in glycerine jelly and demonstrated clearly the pathological conditions in each eye. He divided them into three classes: 1st, those that followed extraction of the lens; 2d, those that occurred in irido-cyclitis and glaucoma—there were two cases of this kind; and, 3d, those that followed violence, such as gouging.

Dr. J. GUTTMAN demonstrated a case of **intraorbital abscess due to empyema of the antrum of Highmore.** The case was that of a child, five years old, who was seen four weeks before. The temperature was 104°. The left cheek and both lids of the left eye were swollen. There were proptosis and chemosis. The pupil was grayish and reacted to light, but fundus could not be seen. Dr. Guttman said that he consulted an eye surgeon who diagnosed thrombosis of the orbital veins and made a fatal prognosis. The left nostril was filled with pus and the two bicuspid teeth were carious. The two teeth were extracted but no pus escaped. The antrum was then opened and an ounce of foul-smelling pus escaped. He curetted the antrum and found necrosis there. The next day the temperature fell and patient could see. He made an incision at the inner corner of the eye, extending to bridge of nose, and found the ethmoidal cells and the perpendicular plate of the ethmoid necrosed. There was good communication between orbit and nose.

DR. Guttman thought that the origin of the condition lay in the carious teeth because the mother stated that the child first complained of pain in the teeth. From the antrum the pus then escaped into the orbit, the ethmoidal and the sphenoidal cells. He found the whole orbit full of pus.

Dr. H. KNAPP thought the disease started in the frontal sinus. He had seen such cases.

Dr. POOLEY was inclined to think that the case was originally one of sarcoma of the antrum and he thought that sarcoma cells should be looked for.

Dr. JOHNSON agreed with Dr. Pooley.

Dr. T. R. POOLEY described a case of **herpes zoster ophthalmicus.** The patient was not present. The case, he thought, was typical. The cicatrices were very deep. The cornea was involved as was usual when the nasal branch of the nerve was affected and often the keratitis was parenchymatous.

Dr. WM. M. LESZYNSKY spoke of a case of herpes zoster and

said the condition was due to acute degenerative neuritis of the supraorbital nerves, in which the analgesia and neuralgia had persisted for a year. He compared herpes in this region with the herpes intercostalis and said there was rarely, if ever, such evidence of neuritis in the intercostal form.

Dr. POOLEY said it was due to inflammation of the nerve in the branches or at the Gasserian ganglion.

Dr. CHAS. H. MAY showed a case of **injury to an eye with loss of lens, entire iris, and exposure of ciliary processes.** One year ago a young man received a perforating wound of the cornea from a nail. The iris was torn entirely away, the lens was extruded, there was loss of vitreous, and the eye collapsed. The ciliary processes were clearly exposed and were apparently drawn forward. There was a central opacity to which the ciliary processes seemed attached by inflammatory products.

Dr. POOLEY asked if Dr. May was certain that there was no lens substance remaining. He thought the opacity in the centre might be due to remaining lens matter.

Dr. MAY replied that he had not seen the lens and so was not certain it had been lost, but in view of the extreme damage done by the accident he thought it very probable none of it remained any longer in the eye. He thought the white scar to which the ciliary processes were attached was largely due to opaque capsule.

Dr. ARNOLD KNAPP again demonstrated one of his specimens which showed the extensive changes wrought in the eye by gouging. Both iris and lens were lost. He thought the specimen particularly interesting in view of Dr. May's case.

Dr. T. R. POOLEY showed a case of **van Fleet's modification of Panas's operation for ptosis.** Dr. Pooley showed the case for Dr. GEO. A. TAYLOR, who had done the operation. The result was excellent. The case was discussed by Dr. H. KNAPP, Dr. FRANK, and Dr. MATTHIAS L. FOSTER.

Dr. H. KNAPP made some remarks in regard to **injecting physiological saline solution into eyes that collapse after operation,** and demonstrated a patient. The remarks were published in this volume of these ARCHIVES, No. 3, p. 300.

Discussion: Dr. T. R. POOLEY had seen the case of cholesterine cystals and thought the result marvellous.

Dr. FRANCIS VALK read a paper entitled **strabismus: a theory and treatment.** After stating the different theories as advanced by Donders, Priestley Smith, Hansen Grut, Walfors,

and others, in which he claimed they placed all the cases of squint in nearly the same class, the writer proceeded to advance his own views. His observations were based on one hundred and thirty cases noted since he came to his present conclusions. He divided squint into two great classes:

1. Those with congenital amblyopia, vision always being less than $\frac{20}{100}$, with the loss of the fusion power in the amblyopic eye, so that the eye turns in the direction of the more powerful lateral muscle, generally inward.

2. Those with a refractive error of some kind, or possibly emmetropia. In these cases an antecedent anomaly of the muscles exists. In this class is found the amblyopia ex anopsia.

In operating he was accustomed in the first class to take a "tuck" in the over-strong muscle with catgut sutures and before they are tied to cut the opposing muscle from its scleral insertion.

In the second class he urged the exact estimation of the refraction and its correction before any operation is attempted.

In case of an operation being necessary he advised a single tenotomy or an advancement according to the necessities of the case.

He demonstrated several cases illustrative of his method of operating.

Discussion: Dr. T. R. POOLEY said he had no remarks to make about the theory Dr. Valk had set forth. But he said he thought the case in which Dr. Valk had tenotomized the internal rectus and had "tucked" the external would surely result in divergence. He was opposed to any method that reduced the motility of the muscles below their normal limits.

Dr. VALK thought he had enough experience to support his views. He did not think any bad result likely to result from tucking or doubling the muscle. The cases for each operation must be carefully selected.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE FIRST QUARTER OF THE YEAR 1899.

By Dr. ST. BERNHEIMER, in Vienna; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Prof. P. SILEX, in Berlin;

with the assistance of

Dr. G. Abelsdorff, Berlin; Dr. Swan M. Burnett, Washington; Dr. Dalén, Stockholm; Dr. Herrnheiser, Prague; Prof. Hirschmann, Charkow; Dr. Krahnstöver, Rome; Dr. P. von Mittelstädt, Metz; Prof. Da Gama Pinto, Lisbon; Dr. Richard Schweigger, Berlin; Dr. Sulzer, Paris; Dr. L. Werner, Dublin; Dr. C. H. A. Westhoff, Amsterdam; and others.

Translated by Dr. Ward A. Holden.

Sections I.–III. Reviewed by Prof. HORSTMANN.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

631. Rolles. *Traité d'ophtalmoscopie.* Paris, Masson, 1899.

632. Oeller. *Atlas des Ophthalmoskopie.* Part v. 15 plates with text. Wiesbaden, 1899. Lehmann.

633. Wilm. The ophthalmology of Alkoatim (1159). Part ii. *Inaug. Dissert.* Berlin, 1899.

634. Wagenmann. The new grand ducal eye clinic at Jena. Weimar, 1899.

635. Wicherkiewicz. Reports from the eye clinic of the Jagéellon University at Cracow, 1898.

636. Wicherkiewicz. The university eye clinic at Cracow in 1896–1897. 1898.

637. Haas. 33d report of the charitable eye institute in

Rotterdam, for 1898. (5054 patients, 247 in-patients, 55 cataract operations.)

638. BOUVIN. 9th report of the eye institute at Gravenhagen, for 1898. (4146 patients, 220 in-patients, 23 cataract operations.)

639. MULDER. 6th annual report of the eye clinic at Groningen, for 1898. (1762 patients, 154 in-patients, 30 cataract operations.)

640. VAN MOLL. Report of the eye clinic in Amsterdam, for 1898. (2939 patients, 190 in-patients, 69 cataract operations.)

641. GUNNING. Report of the eye clinic in Amsterdam, for 1898. (12,244 patients, 257 in-patients, 27 cataract operations.)

642. MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY. 73d annual report, 1898.

643. MANHATTAN EYE AND EAR HOSPITAL. 29th annual report, 1898.

644. BROOKLYN EYE AND EAR HOSPITAL. 30th annual report, 1898.

645. NEW YORK OPHTHALMIC AND AURAL INSTITUTE. 29th annual report, for the year ending Sept. 30, 1898.

646. BERGER. The ophthalmology (*Liber de Oculo*) of Petrus Hispanus. Munich, 1899. Lehmann.

The fifth part of OELLER's (632) atlas concludes the regular undertaking. A supplementary part containing ophthalmoscopic rarities will appear soon.

WILM's (633) dissertation is a continuation of Jelsch's, which appeared in 1898, and contains a translation of the ophthalmology of Alkoatim.

WICHERKIEWICZ's (635) reports from the Cracow clinic form a book of one hundred pages containing statistics as to patients, scientific articles by various authors (which will be reviewed elsewhere), and a detailed description of the new luxurious clinic.

73d annual report for 1898. There were treated at the outpatient department of the Mass. Charitable Eye and Ear Infirmary (642) during the year 1898, 15,486 new eye patients. There were admitted to the wards 1096 eye patients. The usual carefully prepared table showing the results of cataract extractions is given, from which we learn that there were 140 extractions in all. Gräfe, 46; simple, 38; simple with buttonhole in iris, 31; cata-

ract other than senile, 25. Of the 38 simple extractions only 4 had a result below 0.1. Of the 30 "buttonholes," 2 had results below 0.1, and of the 46 Gräfes, 4 had less than 0.1.

BURNETT.

The number of eye patients treated at the Manhattan Eye and Ear Hospital (643) during the year 1898 was 12,996. There were 56 extractions with iridectomy and 41 simple. BURNETT.

The number of new patients treated in the Eye Department of the Brooklyn Eye and Ear Hospital (644) during 1898 was 10,571. There were 6 extractions with iridectomy and 10 simple.

BURNETT.

During the year there were treated at the New York Ophthalmic and Aural Institute (645) 9029 new eye patients in the Dispensary Department, and 468 in the Hospital. There were 618 operations performed on the eye, of which 123 were simple extraction of mature senile uncomplicated cataract and 5 with iridectomy; on the whole, 216 operations for cataract.

BURNETT.

BERGER (646) has collected the *Liber de Oculo* of Petrus Hispanus, Peter of Lisbon, later, Pope John XXI. (1276–1277), from manuscripts in the libraries of Munich, Florence, Paris, and Rome. The whole furnishes an interesting picture of the state of ophthalmology in the middle ages.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

647. MORAX. Remarks on Weichselbaum and Müller's article: On the Koch-Weeks bacillus of acute conjunctivitis. *Graefe's Arch.*, xlvii., p. 662.

648. MORAX. Experimental researches on the bacillus of acute contagious conjunctivitis (Weeks bacillus). *Ann. d'ocul.*, cxxi., p. 42.

649. VALUDE. Sponge-grafting in the capsule of Tenon. *Ibid.*, p. 38.

650. BULLOT and LOR. On the effect of the corneal epithelium on the state of the endothelium and the corneal stroma in transplanted eyes. *Ibid.*, p. 52.

651. LORATO. On the ocular changes due to inanition. *Arch. di Ottalm.*, v., p. 286.

652. HILBERT. Products of fœtal inflammation in one eye,

coloboma and amblyopia in the other. *Zehender's klin. Monatsbl.*, xxxvii, p. 122.

653. VAN DUYSE. Aplasia of the optic nerve and "macular" coloboma in a cyclopic eye. *Arch. d'opht.* xix., 1, p. 25, and 2, p. 106.

654. CLUZET. A new explanation of the pupillary shadow. *Arch. d'opht.*, xix., 3, p. 187.

655. DREYER-DICTFR. On the diagnostic value of the ophthalmoscopic stigmata of degeneration. *Ann. d'ocul*, cxxi., p. 46.

656. HAUENSCHILD. On antisepsis and asepsis in operations on the ball, with remarks on the after-treatment of cataract patients. *Zeitschr. f. Augenheilk.*, 1, p. 227.

657. ULRY and FRÉGALS. Experimental researches on the penetration into the eye of collyria containing iodide of potassium. *Arch. d'opht.*, xix., 1, p. 1, and 3, p. 159.

658. TORNATOLA and ALESSANDRO. Subconjunctival injections of chloride of sodium. *Arch. di Ottalm.*, v., p. 92.

659. LICHERER. Investigations on the sterilization of India ink for tattooing the cornea. *Arch. f. Augenheilk.*, xxxix., p. 22.

660. GÜNSBERG. On suturing penetrating wounds of the cornea. *Wjest. ophth.*, 1899, No. 1.

661. BEARD. Exophthalmic goitre attended by rapid increase in myopia occurring in an elderly subject. *Amer. Journ. of Ophth.*, Feb., 1899.

662. MORTON. Simple enucleation not a proper surgical procedure. *Annals of Ophth.*, Jan., 1899.

663. BRUNS. A microphthalmic family. *Amer. Jour. of Ophth.*, Mar., 1899.

In order to correct an erroneous statement by Weichselbaum and Müller, MORAX (647) presented to the Paris Ophthalmological Society pure cultures of the Weeks bacillus on serum-agar. The colonies are punctate and transparent. The bacillus grows also in serum bouillon, which it renders slightly cloudy. From a culture made two years ago, Morax has grown successive colonies, inoculating ascites-agar weekly; in this time there has been no change in the bacillus. For the animal organism the Weeks bacillus is not pathogenic and infection does not take place.

SULZER.

VALUDE (649) presented to the Paris Ophthalmological So-

ciety a patient, into whose capsule of Tenon, after enucleation of the eye, he had inserted a piece of sponge, with the intention of securing greater mobility in the artificial eye. A year after the operation the stump had shrunk to a third of its original volume.

In the discussion, Billot remarked that Cornil had shown by experiments on animals that sponge grafted into the liver was quickly absorbed. SULZER.

BULLOT and LOR (650) placed rabbits' eyes in the abdominal cavities of the animals. Twenty-four hours later they found the corneas œdematous, twice as thick as the normal, and deprived of their endothelium. These changes were brought about only when the epithelial layers remained intact. If this were removed the corneal layers remained clear and did not swell, and the endothelium remained intact. When a small area only was denuded of epithelium, the corresponding portion of the cornea remained clear, while the remainder became swollen. SULZER.

LODATO (651) examined the eyes of dogs which were allowed to die from starvation or from starvation and the lack of water. Before death he found slow pupillary reaction, white discs, small retinal arteries, and large veins.

The histological changes involved almost all tissues of the eye. The cornea endothelium and the pars ciliaris retinæ and the retinal pigment epithelium were degenerated, the iris was thin and anæmic, and the inner layers of the retina were œdematous. No atrophic changes were found in the optic nerves.

KRAHNSTÖVER.

CLUZET (654) explains the shadow test by means of two simple experiments. Before a sheet of paper representing the fundus is placed a convex lens at a shorter distance than its focal distance. If now a piece of black paper is moved over the white background, as seen through the lens, the shadow moves in the same or the opposite direction according as the observing eye is within or beyond the conjugate focus of the lens. If an image of a flame is thrown on the lens and the white background with a plane-mirror, one will see the image move with the movements of the mirror. V. MITTELSTÄDT.

ULRY and FRÉGALS (657) found that aqueous solutions of iodide of potassium dropped into the conjunctival sac soon passed into the aqueous humor, but did not reach the vitreous until a time when it could be detected in the urine. When given

internally, in ordinary doses, iodide of potassium cannot be found in the ocular liquids, although it appears when large doses are given. Considerable quantities were found in the aqueous, however, when it was instilled into the eye and given internally at the same time.

In order to determine whether diffusible substances instilled into the conjunctival sac pass through the cornea or the conjunctiva to reach the aqueous humor, a solution of iodide of potassium was brought first upon the one and then upon the other. It was found that diffusion takes place almost exclusively through the cornea. If the epithelium remains intact, diffusion is much slower through the dead than through the living cornea. The aqueous humor does not ordinarily pass through the cornea, because it is of the same composition as the tears. If other liquids are brought into the conjunctival sac, the aqueous humor appears there. When an ointment containing iodide of potassium is placed in the conjunctival sac, the salt alone enters the anterior chamber, and this takes place most readily when the ointment has lanolin for its base. v. MITTELSTÄDT.

Since Hamilton has found a capsule bacillus in India ink, which, according to LICHERER (659), causes a corneal abscess when inoculated in pure culture, the latter proposes to sterilize the ink by heat.

GUNSBERG (660) believes that the suturing of scleral wounds will preserve many eyes which now it is customary to enucleate. In a case of the author's a sharp arrow perforated the lid and the eyeball, causing a scleral wound 2.5 *cm* long, through which the choroid prolapsed. The prolapse was excised and the wound closed by three scleral sutures, and one conjunctival suture in the ciliary region. The wound healed by first intention, the eye remained of good appearance and there was perception of movements of the hand. HIRSCHMANN.

The chief point of interest in BEARD'S (661) case is that a woman in good health and sixty-one years of age, with a M = 5 D after an illness associated with great loss of flesh and symptoms of exophthalmic goitre, had a rapid increase of the myopia to − 13 in the right and − 9 in the left. Visual acuteness was also somewhat diminished. BURNETT.

MORTON (662) here enters into a fuller description of his modification of Mules's operation in which the glass ball is inserted into the capsule of Tenon instead of the scleral cavity. Strict

attention must be given to the careful adaptation of the sutures so that the tendons shall occupy the same position as in the healthy eye. BURNETT.

BRUNS (663) reports a case where a number of children—two of whom were seen and examined—of the same family were microphthalmic. The globes were not larger than peas, but there were clear corneæ, through which irides could be seen and opaque lenses. The father had good eyes. The mother had $V = \frac{8}{10}$ and a low degree of astigmatism. BURNETT.

III.—INSTRUMENTS AND REMEDIES.

664. HALLAUER. On the turning red of eserine. *Zeitschr. f. Augenheilk.*, 1, p. 364.

665. KOSTER. On the injurious action of muriate of cocaine. *Geneesk. Tijdskrift*, 1, 1899, p. 621.

666. BLOK. Neutral sulphate of atropine and muriate of cocaine. *Med. Weekbl.*, 1899, May 13.

667. BIETTI. On the physiological action of arecoline on the eye, with some considerations on its application in the treatment of glaucoma. *Arch. di Ottalm.*, v., p. 33.

668. FALTA. Largin in ophthalmology. *Centralbl. f. prakt. Augenheilk.*, xxiii, p. 46.

669. JAKOWLEW. On the beneficial action of Pöhl's spermin in eye diseases. *Wratsch*, 1899, No. 10.

670. SCRINI. Experiments with oily collyria. *Arch. d'opht.*, xix., 1, p. 11.

671. ULRY and FRÉGALS. Aqueous solutions of salicylate of soda as collyria. *Ibid.*, 2, p. 90.

According to HALLAUER (664), we have no preparation of physostigmine that will not undergo decomposition. Decomposition by light is accomplished mainly by the rays in the blue end of the spectrum. There are two agents which partly prevent decomposition: sulphurous acid, and 4% boric acid, of which the former is preferable. These chemicals do not affect the action of physostigmine solutions. The salicylate is more permanent than the sulphate, and a drop or two of sulphurous acid added to the solution greatly increases its permanency.

KOSTER (665) objects to the continued use of cocaine in ulcers of the cornea and chronic conjunctivitis. He has sometimes seen

a peculiar form of follicular conjunctivitis follow the continued use of 5 % cocaine. WESTHOFF.

(666) Sulphate of atropine and muriate of cocaine solutions if of acid reaction irritate the eyes and only neutral solutions should be used. If Koster found that 5 % cocaine caused conjunctivitis it was doubtless because he was using an acid solution. WESTHOFF.

Arecoline, according to BIETTI (667), is a very energetic miotic both in healthy and in glaucomatous eyes. It acts more powerfully and energetically than eserine, but its effect is of shorter duration, so that it is of practical use in glaucoma only in cases in which eserine fails to produce miosis. KRAHNSTÖVER.

JAKOWLEW (669) injected spermin subcutaneously with benefit in cases of optic-nerve atrophy, tobacco amblyopia, and opacities of the vitreous (after the underlying serous choroiditis had been recovered from). HIRSCHMANN.

SCRINI (670) was convinced of the rapid action of oily solutions of eserine in two cases of glaucoma in which aqueous solutions of pilocarpine and eserine had no effect. Continuing his experiments, he found that other alkaloids, such as duboisine, homatropine, and scopolamine, as well as eucaine, holocaine, and arthopine, were useful in oily solutions. The disadvantages of these solutions, viz., their tendency to stain clothes and to obscure the view in ophthalmoscopy or in corneal operations, may be overcome and are not of importance. V. MITTELSTÄDT.

The experiments of ULRY and FRÉGALS (671) show that when salicylate of soda is given internally but little of the salt appears in the aqueous humor, but that when dropped into the conjunctival sac much more of it enters the eye. In all cases in which the remedy is indicated it would be well to use it locally as well as internally. V. MITTELSTÄDT.

Sections IV.–VII. Reviewed by DR. ST. BERNHEIMER, VIENNA.

IV.—ANATOMY.

672. ALFIERI. On the distribution of elastic fibres in the lid margins. *Ann. di Ottalm.*, xxvii., 4.

673. GALLENGA. On the principal congenital alterations in the lachrymal caruncle, with remarks on its structure and development. *Arch. di Ottalm.*, v., p. 1.

674. TORNATOLA. On the origin and nature of the vitreous. *Ibid.*

675. CAPELLINI. On the nerves of the cornea as demonstrated by Golgi's method. *Ibid.*, p. 191.

676. COSMETTATOS. Researches on the development of the lachrymal passages. *Thèse de Paris*, July, 1898.

677. KIRIBUCHI KYOJI. On the elastic tissue in the human eye, with remarks on the dilator muscle of the pupil. *Arch. f. Augenheilk.*, xxxviii., p. 177.

678. SMIRNOW. On the structure of the chorioidea propria (stratum elasticum supracapillare) in man. *Graefe's Archiv*, xlvii., 3.

679. RITTER. Development of the frog's lens. *Arch. f. Augenheilk.*, xxxvii., p. 354.

GALEENGA (673) examining a series of embryos finds that the caruncle first appears at the end of the third month. The glandular elements develop at the same time with those of the lids. Gallenga agrees with Krause and others that Krause's glands are often found in the caruncle, but in his opinion sweat glands and glands of Moll are entirely wanting. Elastic tissue is present in considerable quantity, particularly in the superficial layers.

KRAHNSTÖVER.

Capellini's (675) paper consists of descriptions of the nerve endings in the cornea in different classes of mammals, and is interesting from the standpoint of comparative anatomy.

KIRIBUCHI KYOJI (677), in the university clinic in Berlin, repeating Sattler's investigations on the elastic tissue of the eye, but using a new Weigert method, confirms Sattler's results as regards the sclera. Very few elastic fibres were found in the iris, and the limiting membrane does not stain like elastic tissue. In general the amount of elastic tissue increases with age.

V.—PHYSIOLOGY.

680. PARINAUD. Vision. A physiological study. Paris, 1898. O. Doin, editeur.

681. FENOLTEA. Monocular vision and designing. *Arch. di Ottalm.*, v., p. 227.

682. PES. Microchemical researches on the secretion of the palpebral sebaceous glands. *Ibid.*, p. 82.

683. LODATO. On the movements of the pigmented epithelium of the retina. *Ibid.*, p. 395.

684. ANGELUCCI. On the histogenesis of the basal internal limiting membrane of the choroid and of the zone of Zinn. *Ibid.*, p. 383.

685. SNELLEN, H., Jr. On the perception of light and colors. Utrecht, 1899.

PARINAUD (680) collects, in a clearly written volume, the fundamental problems of physiological optics. The captions of the chapters are as follows: 1. Functions of the retina. 2. The rôle of the retina and the rôle of the brain in vision. 3. Anatomical considerations. 4. Binocular vision. 5. Simultaneous vision. 6. Alternating vision. 7. The physiological rôle of the three modes of vision.

VI.—REFRACTION AND ACCOMMODATION.

686. BOTWINNIK. On changes in astigmatism under the influence of some physical and physiological factors. *Dissert.*, St. Petersburg, 1898. *Wratsch*, 1899, No. 4.

687. ROGMANN. The operative treatment of myopia. *Ann. d'ocul.*, CXXI., p. 1.

688. FUCHS. On the operative treatment of high myopia. *Wiener klin. Wochenschr.*, 1899, No. 6.

689. KLINKOWSTEIN. Report of 50 myopia operations done by Professor Haab at Zurich. *Inaug. Dissert.*, Zurich, 1899.

690. FISCHER. Operation for myopia and detachment of the retina. *Centralbl. f. Augenheilk.*, XXIII., p. 79.

691. STRAUB. On senile hyperopia. *Nederl. Oogheelk. Bydragen*, 1899, p. 11.

692. BURNETT. Astigmatism acquired by a change in the curvature of the cornea. *Amer. Jour. of Ophth.*, Feb., 1899.

BOTWINNIK (686) gives the results of his studies on the correction of astigmatism: (*a*) through pinching the lids together, and (*b*) through unequal contraction of the ciliary muscle. The pinching together of the lids may increase the acuteness of vision twofold in regular astigmatism and myopia, not only by narrowing the palpebral fissure in the form of a stenopaic slit, but also by flattening the cornea. Exercising lateral traction on the lids flattened the cornea as much as 2–6 D, increasing the

vision in myopia and in astigmatism against the rule two- or threefold. Pulling the lids wide apart has the same effect as pinching them together. After paralyzing the accommodation in 30 cases of hyperopic astigmatism, the author concludes that an unequal contraction of the ciliary muscle may correct from 0.5–2.5 D of astigmatism. HIRSCHMANN.

In order to avoid the chief dangers of the operation for myopia, viz., loss of vitreous and subsequent detachment of the retina, ROGMANN (687) proposes the following operation: A discission is made with Bowman's needle without injuring the posterior capsule of the lens. From four to fourteen days after the discission the lens masses are removed by aspiration with Teale's apparatus. SULZER.

The short report by FUCHS (688) is of much more value than many of the longer articles on the operations for myopia. Its purpose is to restrict the indications which most operators have considered sufficient. This is an operation in which enthusiasm on the part of the operator is regrettable, for it is likely to lead to the injury of many myopes, and to bring into discredit an operation which, in selected cases, is of value.

Fuchs operates only when the myopia is above 15 D, and when the fundus changes are not advanced. An eye suitable for operation is not operated upon unless the other eye is serviceable, and unless the patient is under forty years of age. The operation is not free from danger, it does not prevent the development of further changes in the fundus, and is not necessary to preserve sight.

KLINKOWSTEIN (689) reports on 50 myopia operations done by Haab. In none was there infection and none was followed by detachment of the retina. The ages ranged from nine to fifty-three years, and the myopia from 8–26 D. The majority of the patients were between the ages of fifteen and thirty. In almost all the eyes the vision was improved very considerably.

In the case by BURNETT (692) there was an increase in the curve of the cornea, as measured by the ophthalmometer, of 2.5 D in one eye and 0.75 D in the other, in the course of six years. The girl was healthy, and there had been no traumatism nor other form of inflammation. The change was "according to the rule." BURNETT.

VII.—MUSCLES AND NERVES.

693. DE MICAS. "Tare nerveuse" as a factor in strabismus. *Ann. d'ocul.*, cxxi., p. 81.

694. GERONZI. A contribution to the study of ocular disturbances in affections of the ear. *Arch. italiano di otol.*, vii., 4.

695. BACH. On paralysis of the ocular muscles and disturbances of the pupillary reaction. *Graefe's Arch.*, xlvii., 3, p. 508.

696. TÜRK. Remarks on a case of retraction movements of the eyeball. *Centralbl. f. prakt. Augenheilk.*, xxx., p. 14.

697. COLBURN. Further observations concerning the check ligament. *Ophth. Record*, March, 1899.

698. POSEY. De Wecker's capsular advancement operation. *Annals of Ophth.*, Jan., 1899.

699. GAMBLE. Voluntary lateral nystagmus. *Jour. Am. Med. Assoc.*, March 4, 1899.

DE MICAS (693) finds among the immediate and collateral ancestors of patients with squint a great number who are neuropathic. The commoner forms of such neuropathy in the order of their frequency are idiocy, psychoses, and epilepsy. An ametropic child of neuropathic parents will usually squint. And, although the ametropic may have strabismus without any hereditary predisposition, a hereditary predisposition may bring about strabismus in a child whose eyes are emmetropic ; as, for example, in the case of hysterical squint. The neuropathy, in the sense understood by the author, need not be characterized by the advanced degeneration existing in the hysterical, epileptic, and the like. The hereditary disposition caused by ordinary nervousness in the parents may manifest itself in the children only in convulsions and such unimportant and quickly forgotten symptoms and yet be sufficient to bring about squint. SULZER.

GERONZI (694) reports a case of purulent otitis media in the course of which, about the twentieth day, there appeared suddenly a paralysis of one external rectus. The paralysis soon passed off of its own accord, while the suppuration was stopped only by operative measures. The author expresses no opinion as to the connection between the two. KRAHNSTÖVER.

BACH (695) made many experiments on rabbits, cats, and monkeys, and studied human specimens as well, in order to determine the exact location and composition of the nuclei of origin of the nerves supplying the ocular muscles, and the course of the fibres arising from them. His findings cannot be given intelligibly in an abstract.

After removing the iris and ciliary body or after exenteration

of the ball, almost all the cells in the ciliary ganglion showed well marked changes after a few days. After more or less extensive destruction of the sensory nerves of the cornea no noticeable changes were found in the cells of the ciliary ganglion. Bach's studies of the ciliary ganglion seem to indicate its sympathetic nature. The reflex centre lies not in the brain but in the upper portion of the cerebral portion of the cord, directly beneath the medulla oblongata. HORSTMANN.

TÜRK (696) describes a case of retraction movement of the eye, which is similar to two cases previously reported (*Deutsche med. Wochenschr.*, No. 13, 1896). In this case there was a congenital weakness of abduction, and action of the internal rectus retracted the eye and caused a narrowing of the palpebral fissure. The congenital nature of the weakness of abduction was proved in the present case also by the lack of secondary contracture of the antagonists.

COLBURN (697) has continued his studies on the check ligament of the ocular muscles, and has operated on three cases of squint—two of which were convergent and one downward—by severing the check ligament alone with what he calls "forcing stitches" to exaggerate the result. In no case was the tendon severed. The result in all the cases was satisfactory. He considers there is a wide opportunity for study in this field opened up by the studies of Motais and Maddox on the check ligament. BURNETT.

POSEY (698) reports the final effects, mostly after a period of two years, in thirty-three cases of capsular advancement according to De Wecker. The average final gain in these cases was about 6°, though the immediate gain in some cases was as much as 50°. Twenty-eight of these cases were exophorias, varying from 6° to 25°, and the improvement in the symptoms was very great, though subjectively the effect seemed to be small.

BURNETT.

In the case reported by GAMBLE (699), a young man of twenty-four, perfectly healthy, with vision of $\frac{20}{20}$, has been able since his fifteenth year to produce voluntarily a lateral nystagmus. He cannot continue it beyond a minute, nor can he produce it with one eye alone. BURNETT.

Sections VIII.–XII. Reviewed by DR. R. SCHWEIGGER, BERLIN.

VIII.—LIDS.

700. JOERS. Demodex or acarus folliculorum and its relations to inflammation of the margin of the lid. *Deutsche med. Wochenschr.*, 1899, No. 14.

701. TROUSSEAU. The treatment of eczema of the lids. *Arch. d'opht.*, xix., 2, p. 119.

702. BRUCKMAYER. Syphilitic tarsitis. Sitzungsbericht. *Ungar. med. Presse*, 1899, No. 14.

703. WICHERKIEWICZ. On the operative technique of ectropium of the lower lid. *Beiträge z. Augenheilk.*, xxxviii., p. 14.

704. GEISMAR. On congenital defects of the lid. *Ibid.*, xxxvii.

705. ROOSE. A case of poliosis of the lids. *Ann. de l'Institute Saint-Antoine à Courtoix*, April, 1898.

JOERS (700) does not recognize Raehlmann's blepharitis acaria as a special form of inflammation of the lid, since the presence of the acarus does not cause a peculiar clinical picture, and he has found the acarus in normal lids more frequently than in diseased lids.

The case of syphilitic tarsitis demonstrated by BRUCKMAYER (702) is remarkable because the affection of the tarsus appeared in the secondary stage of the disease. HERRNHEISER.

WICHERKIEWICZ'S (703) method can be used alone or in combination with other methods for relieving ectropium of the lower lids. It consists in a displacement of that portion of the orbicularis muscle which lies in front of the tarsus to a position above the tarsus.

GEISMAR (704) reports five cases of coloboma of the lids, upper as well as lower, unilateral and symmetrically bilateral, in conjunction with other clefts of the face and dermoids. He agrees with Van Duyse that the colobomata of the lids arise in consequence of amniotic adhesions, and that the dermoids correspond to the points of adhesion.

ROOSE (705) reports the case of a healthy girl of seventeen with dark brown hair, who was violently frightened in the night. The following morning it was noticed that the eyelashes on the right side and a lock of hair on the right temple had become quite gray. SULZER.

IX.—LACHRYMAL APPARATUS.

706. LANGE. On the anatomy and pathogenesis of dacryops. *Graefe's Archiv*, xlvii., 3, p. 503.

707. CAHN. On the etiology and therapy of dacryocystoblennorrhœa. *Beiträge z. Augenheilk.*, xxxix., p. 1.

708. ARONIS. Extirpation of the lachrymal sac. *Ann. d'ocul.*, cxxi., p. 198.

709. ROCHON-DUVIGNEAUD. A dilatation of the lachrymal passages in the fœtus and the new-born in consequence of closure of their lower orifice. The anatomical conditions which favor congenital dacryocystitis. *Arch. d'opht.*, xix., 2, p. 81.

LANGE (706) observed a case of bilateral dacryops. On one side the tumor swelled to the size of a hazel-nut when the patient wept, and pressed upon the eye. After being removed under cocaine anæsthesia, the tumor proved to be a retention cyst caused by the stoppage of the ducts of exit from a desquamative catarrh.

CAHN (707) probes the lachrymal duct only in cases in which there is no question as to the existence of stricture, but he considers removal of secretion to be of great importance. Irrigation of the sac with disinfecting and astringent solutions produces improvement even in obstinate cases. He uses oxycyanide of mercury, 1:5,000–1:10,000, bichloride of mercury, 1:20,000, or permanganate of potassium, 1:10,000; for astringent solutions he has used nitrate of silver, and recently argonin. The latter remedy was used with good results. He begins with a 4% argonin solution in glycerine and water. As soon as the secretion has lost its purulent character he uses weaker solutions, and concludes the treatment with irrigation of the sac three times a week for three weeks with ¼–½% solution of iodine in glycerine. In obstinate cases, and especially when there is a fistula, he employs also a pressure bandage or a special compressor fastened to a band about the forehead. In case of granulation or caries of the lachrymal bone he curettes. Extirpation of the sac is undertaken only in extreme cases, since the results of the operation are unsatisfactory.

HIRSCHMANN.

ROCHON-DUVIGNEAUD (709) in thirty new-born infants found unilateral or bilateral closure of the lower end of the canal in three. There is swelling of the mucosa at the orifice, or a deformity of the exit, which prevents the passage of the tears. The dilatation of the canal so produced may affect the bony wall

causing the variety in size of lumen which is found in adults. If infection takes place, a suppurative inflammation of the sac ensues, but this may pass off after probing the canal a single time. In several frontal sections the author demonstrated the distension of the canal and the elevation at its orifice, above which in two cases there was further a membranous obstruction, while folds of mucous membrane projected into the lumen of the canal at other points. V. MITTELSTÄDT.

X.—ORBIT AND NEIGHBORING CAVITIES.

710. COPPEZ. Fracture of the vault of the orbit with contusion of the globe and traumatic intraorbital adhesions between the levator of the lid and the superior rectus. *Arch. d'opht.*, xix., 3, p. 183.

711. HOFFMANN. On affections of the orbit due to suppuration in the accessory cavities of the nose. *Jahresber. d. Ges. f. Nat. u. Heilkunde i. Dresden*, 1897–98, p. 6.

712. SANTOS FERNANDEZ. The exenteration of the orbit and the ablation of the lids; their advantages in some cases of neoplasms of the eye. *Annales de oftalm.*, i., 6, p. 141.

713. GALLEMAERTS. Traumatic suppurative tenonitis. *Ann. d'ocul.*, cxxi., p. 57.

714 BLASCHEK. Two cases of echinococcus of the orbit. *Wiener klin. Wochenschr.*, 1899, No. 6.

715. VENNEMAN. Double orbital lymphoma in an adult. *Ann. d'ocul.*, cxxi., p. 56.

716. GALLENGA. A contribution to the study of the congenital tumors of the orbit (fibro-lipoma). *Arch. di Ottalm.*, vi., 5, p. 133.

717. FISCHER. Traumatic enophthalmus. *Centralbl. f. pr. Augenheilk.*, xxvii., p. 48.

718. REIF. A case of bilateral pulsating exophthalmus. *Beitr. z. Augenheilk.*, 38, 1899.

719. LEITNER. A case of periodic exophthalmus. *Ung. med. Presse*, 1899, No. 7.

720. ELLINGER. A case of empyæma of the frontal sinus, with operative removal of the posterior bony wall for caries. *Zeitschr. f. Augenheilk.*, i., 2, p. 74.

COPPEZ'S (710) patient was struck with a heavy piece of iron,

and suffered a fracture of the roof of the orbit with contusion of the ball, revealing itself in dilatation and immobility of the pupil, rupture of the choroid and hemorrhages of the retina. While the mobility in the horizontal direction was normal, there was complete immobility of the eye and lids in the vertical meridian. Even when seized with forceps the eye could not be drawn upward, so that there must have been a cicatricial adhesion of the levator and the superior rectus to the cellular tissue or periosteum of the orbit. v. MITTELSTÄDT.

BLASCHEK (714) reports two cases of echinococcus cyst of the orbit, only 59 cases of which have been reported since 1774. In a tumor of this sort, which grows slowly and usually fluctuates, a diagnosis cannot be made with certainty. Tapping the cysts for diagnostic purposes is not to be recommended, since it frequently leads to inflammation and suppuration. In both the author's cases the cyst was opened. One healed well, but the other suppurated and required enucleation.

In FISCHER'S (717) case a fall on the upper margin of the orbit caused atrophy of the entire half of the face as well as enophthalmus, so that a simple disappearance of orbit fat could be held responsible for the enophthalmus.

In REIF'S (718) case, after repeated injuries, first a left then a right exophthalmus developed with a pulsating bruit audible over the entire head. Reif explains the condition as being due to a communication between the left internal carotid and the cavernous sinus. Digital compression of the carotid, increased gradually from 3 to 25 minutes at a time, caused a disappearance of the right exophthalmus. In a second case, one of exophthalmus after a penetrating wound of the orbit, the subjective sounds were so annoying to the patient that the common carotid was ligated.

LEITNER'S (719) patient with periodic exophthalmus was a woman of forty-four. When she exerted herself or bent forward the right eye became prominent, while the right upper lid and the surrounding parts became swollen. On assuming an erect position the eye slowly regained its natural position. Since these phenomena had become noticeable the hearing of the right ear began to fail and the patient had continuous tinnitus, increasing when she bent forward. In the right upper lid there was a network of veins. When the patient bent forward these veins became greatly dilated. An extension of these varicose veins caused the exophthalmus.

In ELLINGER's (720) patient, after the frontal sinus had been probed and irrigated for three months without any pus appearing although its presence was suspected, the eye became inflamed and examination showed the posterior wall of the sinus to have been very much thinned by caries. It was chiselled out and a threatening meningitis warded off.

XI.—CONJUNCTIVA.

721. ANGELUCCI. On an unrecognized syndrome in patients with vernal catarrh. *Arch. di Ottalm.*, v., p. 270 *et seq.*

722. COPPEZ. Follicular conjunctivitis and adenoid vegetations in the naso-pharynx. *Arch. d'opht.*, xix., 1, p. 11.

723. JUNIUS. On acute pneumococcus conjunctivitis. *Zeitschr. f. Augenheilk.*, 1899, 1, p. 43.

724. DALÉN. On the bacteriology of conjunctivitis. *Hygeia*, March, 1899.

725. GONIN. On the microbic nature of the conjunctivitis observed at the ophthalmic hospital of Lausanne. *Rév. méd. de la Suisse romain*, 1899, Nos. 2 and 3.

726. KUHNT. On the value of mechanical methods in the treatment of granular conjunctivitis. *Zeitschr. f. Augenheilk.*, 1899, 1, p. 1.

727. GALEZOWSKI. On the treatment of trachoma by excision of the cul-de-sac. *Rec. d'opht.*, 1899, p. 1.

728. DEMICHERI. Conjunctival actinomycosis. *Arch. d'opht.*, xix., 2, p. 102.

729. HÜBNER. On amyloid disease of the conjunctiva. *Beiträge z. Augenheilk.*, 1899, 38.

730. BERL. Pseudo-leukæmic disease of the conjunctiva and orbital tissues. *Ibid.*, 37.

731. GRUNERT. Five cases of papilloma of the conjunctiva. *Zehender's klin. Monatsbl.*, xxxviii., p. 111.

732. BEST. On benign cystic epithelioma of the conjunctiva. *Beiträge z. Augenheilk.*, 37, Jan., 1899.

733. GERY. On a case of congenital cyst of the conjunctiva. *Ibid.*, 39.

734. ZIMMERMANN. A case of hemorrhagic lymphangiectasis of the conjunctiva. *Ibid.*, 37.

735. PECK. Protargol and argonin in the treatment of purulent ophthalmia of infants. *Med. News*, Jan. 21, 1899.

736. SNYDOCKER. Trachoma. Original investigations on its etiologic organism. *Jour. Amer. Med. Assoc.*, Feb. 4, 1899.

737. ABBE. A case of fatal hemorrhage from the conjunctiva. *Annals of Ophth.*, Jan., 1899.

738. HEUSTIS. Osteoma of the conjunctiva. *Ibid.*, Jan., 1899.

739. MORTON. Punctate hemorrhage into the bulbar and palpebral conjunctiva, following the administration of nitrous oxide gas. *Ophth. Rev.*, Feb., 1899.

ANGELUCCI (721) calls attention to an affection of the vascular system which he has found complicating vernal catarrh in 50 patients. The patients were mostly of irritable temper. They suffered from rushing of blood to the face and head; there was palpitation of the heart and an accelerated pulse. Several members of a family were frequently affected. Before he attempts to trace a connection between these symptoms and the conjunctival affection, the author wishes to learn the observations of others in the matter. KRAHNSTÖVER.

COPPEZ (722) describes the various forms of follicular conjunctivitis, and in particular those cases which accompany adenoid vegetations in the rhino-pharynx, of which he reports two cases. These cases recover only when attention is paid to the throat and the scrofulous condition is treated. V. MITTELSTÄDT.

JUNIUS (723) examined bacteriologically the secretion of 60 cases of acute and subacute conjunctivitis, in Kœnigsberg. The pneumococcus was found in 49 cases, in 31 in pure culture, and in 18 mixed with staphylococci and xerosis bacilli. The Koch-Weeks bacillus was not found.

KUHNT (726) recommends, in preference to Knapp's roller forceps which may sometimes tear the conjunctiva, an expressor, which is a forceps with perforated blades, with which the granules may be thoroughly expressed. Individual granulations that return may be destroyed advantageously with the galvano-cautery. Excision of the retrotarsal folds brings about a permanent cure in 50-60 % of patients under unfavorable hygienic conditions, while expression in this class of patients cures only 10 % of cases.

In a patient who presented himself with conjunctivitis, DEMICHERI (728) found in the conjunctiva of one eye, just above the tarsal margin, 15 grayish-yellow nodules, which were found to be

foci of actinomyces. This is common in cattle in South America, and is sometimes directly transferred to man.

v. MITTELSTÄDT.

HÜBNER'S (729) patient, who was healthy except for trachoma in the other eye, had an amyloid tumor which on the conjunctiva of the lower lid and eyeball appeared as a movable translucent uneven mass, bleeding easily, and on the upper lid it has so thickened the tissues that the lid could not be actively lifted. A year after its extirpation, the mass had grown again and the granular conjunctiva of the other eye had assumed a similar character.

BERL'S (730) case was one of pseudo-leukæmia with many tumors on the head and neck. The eyelids were thickened by subconjunctival, grayish-red, homogeneous, opaque nodules, over which the conjunctiva was degenerated. The nodules, which were composed of lymphoid tissue, soon returned after extirpation.

The rare conjunctival tumors, of which one is reported by BEST (732), are either congenital or develop early in life as a dull yellow, translucent, smooth mass, covered with vessels at the corneal limbus, which may increase greatly in size about the age of puberty. They do not return after extirpation. An absolute diagnosis can be made only with the microscope.

ZIMMERMAN'S (734) patient had a 1-*cm*-broad zone of concentric red tracts about the cornea. In microscopic preparations these were recognized as dilated lymph vessels of the conjunctiva which from a trauma had been thrown into open connection with a blood-vessel.

PECK (735) reports seven cases of purulent gonorrhœal ophthalmia which were treated by protargol and argonin. He used protargol powder dusted in the eye three times a day, gradually reduced in frequency to once, and later a 50% solution was used. At the last a 5% solution was used as satisfactorily as the stronger forms.

BURNETT.

SNYDOCKER (736) claims to have isolated a microbe which he deems the cause of trachoma. It is a diplococcus like the pneumococcus, but smaller. His experimental inoculations in animals were not altogether successful, but he succeeded in inoculating a human conjunctiva with a culture and at the end of the third week he claims the appearances were those of typical trachoma. Micro-organisms obtained from the material expressed from the granules were of the same nature as those originally inoculated.

BURNETT.

In the case recorded by ABBE (737), a newly born, apparently healthy but small infant had a slight discharge from the eyes, for which, by mistake, a 60 % sol. of arg. nit. was used for a single time. Soon after the conjunctiva of the lids of both eyes began to discharge blood, which was not controlled, and the child died —presumably from the loss of blood—within forty-eight hours. The conjunctiva of the lids seems to have been completely disorganized. BURNETT.

HEUSTIS (738) gives an account of a tumor of the bulbar conjunctiva upward and outward from the cornea, which, when removed, was found to consist of bone. Its size was $7 \times 4 \times 2$ *mm*, concave and smooth on its inner surface, rough on the outside. The vision was normal. BURNETT.

In the case reported by MORTON (739), a young woman, after the administration of nitrous oxide gas for the extraction of a tooth, had small hemorrhages on her left breast and neck, and on the conjunctiva both palpebral and bulbar, of both eyes—more pronounced in the left. They were gradually absorbed.

BURNETT.

(*To be continued.*)

REPORT OF THE TRANSACTIONS OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY AT ITS MEETING AT NEW LONDON, CONN., JULY 19 AND 20, 1899.

By Dr. H. O. REIK, Baltimore.

The meeting was called to order by the President, Dr. O. F. Wadsworth.

I.—Dr. R. H. Derby, of New York, gave **a demonstration of a new office stereoscope.**

The stereoscope is modified in several particulars from the instrument he described in the Transactions of the New York Eye and Ear Infirmary for the year 1898.

The two half-pictures, held on carriers, controlled for both lateral and vertical displacement by a concealed ratchet movement, move over a plain metal field, on the back of which are horizontal and vertical lines, a centimetre apart. The position of the centre of each half-picture, when stereoscopic vision is secured, is indicated to the observer through an opening in the back of the carrier. The vertical lines are numbered, and the horizontal ones marked by letters of the alphabet. For the use of patients at their homes a less elaborate mechanism was shown. On this the half-pictures were arranged to move vertically on perforated lines, one centimetre apart, and to secure lateral distance the carrier was moved from one vertical line to another, the carrier held secure by a spring confining it to the thickness of the object card.

The author claimed for the stereoscope, especially in its present form, an important place as an instrument for the diagnosis of some muscular anomalies—notably in the case of vertical insufficiency, the indication from the position of the half-pictures, in the interest of binocular vision, was suggestive. Hyperphoria, of however slight degree, was often indicated by a difference in height at which the patient promptly adjusted the pictures.

Under ordinary conditions of muscular equilibrium the lateral

distance from the middle line experience has shown to be 4.5 centimetres. With the pictures placed at 3.5 centimetres, insufficiency of externi, or at 5.5 centimetres of the interni, would be indicated. The author claimed that in its present form the instrument possesses distinct advantage in the orthoptic treatment of muscular anomalies over the limited applicability of the cards of Dahlfeld and Kroll, and was simpler and more readily used than the ingenious series of Javal. The author did not claim that the stereoscope gave an accurate measure of the degree of the muscular weakness. It was rather an aid in diagnosis that deserved a more general recognition, and the present modification was perhaps the best instrument we possessed in the interest of ocular gymnastics.

II.—Dr. F. H. VERHOEFF, of Baltimore, upon invitation of the society, gave **a description of the reflecting phorometer and a discussion of the possibilities of torsion of the eyes.**

The instrument differs from other phorometers in that mirrors are used in place of prisms, thus permitting the greatest simplicity in construction, together with the most advantageous movements in the apparent images. There are four mirrors, two for each eye. By turning a screw the lower mirrors may be made to rotate towards or away from each other, lateral separation of the images thus being produced, and it is to be noted that this arrangement produces equal though opposite movements in the two images. Vertical separation of the images is produced by rotation of one of the upper mirrors.

The parallax test of Duane has been adapted to this instrument. A very important feature of this phorometer is a shutter which slides back and forth before the eyes, so that when it is in use the patient can see with one eye at a time. The shutter is moved back and forth very quickly, a pause being made, however, before each eye so that time is given for the after-image to disappear, and the patient is asked to state whether the object moves or not. If he sees the object apparently moving obliquely, the upper mirror is adjusted until the movement is horizontal, and then the lower mirrors are adjusted until practically all movement is overcome. Both the amount of hyperphoria, and also the esophoria or exophoria, if present, will be indicated upon the scales. It is thus possible by means of the reflecting phorometer to determine the amount of heterophoria either by the diplopia test or by the shut-

ter test, and in addition the amount of abduction, adduction, and right or left sursumduction of the eyes may be readily obtained. Certain disadvantages and inaccuracies in the ordinary diplopia test were pointed out. By means of a special chart consisting of two rotary discs placed one above the other the instrument may be used to determine and measure any possible torsional deviations of the eyes. It was shown that by means of the instrument an artificial torsion could be produced in the retinal image of any object regarded. In this way it was determined that the eyes can bear without discomfort a tilting of the retinal images in the two eyes equivalent to the torsion of 8°. It was stated that torsion could also be accurately measured by means of the shutter test. The possibilities as regards torsion of the eyes were classified as follows:

1. Non-neutralizing declinations of the two eyes. These include declinations which are numerically equal but which have the same sign. 2. Neutralizing declinations of the two eyes. These are numerically equal but have opposite signs. 3. Torsional combining power or an ability so to rotate as to overcome artificially produced declinations. 4. Cyclophoria, a tendency for the eyes to rotate, which, however, is overcome by the action of certain of the ocular muscles.

Four experiments were described to prove that (3), and consequently (4), do not exist. Since (2) could not interfere with perfect binocular vision, (1) is the only remaining possibility of any moment, and for this the term "torsional strabismus" was used. Since the fusion of lines situated upon non-corresponding points of the two retinæ is not due to torsion of the eyes it was spoken of as due to a physical compensation. Dr. Verhoeff believes that the existence of a torsional combining power was assumed by Stevens without sufficient evidence, and that Savage has fallen into an error in assuming the existence of cyclophoria.

III.—Dr. J. O. Tansley, New York. **Congenitally inefficient external rectus and binocular vision.**

Case 1.—When an infant was about six months old it was noticed that he had a slight squint in the right eye, and also that he twisted his head to the right and slightly upwards When he looked straight ahead the eyes were straight, but if he attempted to turn the eyes to the right the right eye could not be moved beyond the middle line. He visited Dr. Tansley when eighteen years of age, when the left eye had perfect motility, but the right,

although it had perfect movement upwards, downwards, and nasally, could not be moved quite to the middle line outwardly. Upon his making a supreme effort to rotate it out the eyelids showed the effort by widely opening and fluttering spasmodically. He had binocular single vision in all parts of the left field, but a pencil held directly in front of him appeared double, and the farther it was moved to the right the greater became the diplopia.

The diagnosis was congenital absence or atrophy of the right external rectus with little or no possibility of benefit by operation. A slight tenotomy was done, however, and the eyes had perfect parallelism in the median line. Ten months later he could read, binocularly, J. No. 1, at four inches; otherwise his condition was the same as at first.

CASE 2.—A clerk, twenty-seven years of age, who has had trouble with his eyes and worn glasses since nine years old. Never squinted, but has always turned his head to the left, or eyes to the right, when working at anything. If he looks directly ahead or tries to turn his eyes to the left he sees double. Examination showed that he could not bring the left eye quite to the median line. Other movements were perfect.

IV.—Dr. F. BULLER, Montreal. **A case of primary tumor of the optic nerve.** The patient was a boy, aged six, in good health save for some slight nervous disturbances. There was marked exophthalmus of the right eye, and ophthalmic examination showed the optic nerve of a pale blue tint with oval outline and irregular edges. Palpation revealed within the orbit a large, somewhat elastic mass, and this, together with the complete blindness, seemed to indicate the presence of a tumor involving the optic nerve. An attempt was made to remove the growth only, but it became necessary to enucleate the globe also. One month after the operation, the patient was reported to be in good health and free from nervous attacks.

A pathological study of the tumor showed that it belonged to that class usually described as myxosarcomatous, but there were changes in the optic nerve which suggested that possibly the whole condition was due to some local disturbance of the lymphatic system.

Discussion.—Dr. REEVE related a case seen at the Birmingham Ophthalmic Hospital, where, in spite of a tumor of the optic nerve, there was preservation of excellent, if not normal, vision.

DR. BULLER said that in two other cases which he had seen,

there was blindness, and he had considered that together with optic atrophy a diagnostic feature of optic-nerve tumors.

V.—Dr. C. A. VEASEY, Philadelphia. **A case of primary non-pigmented sarcoma of the left upper lid.** Dr. VEASEY reported a case occurring in a Polish tailor, forty-five years of age, who had first observed a small growth on his eyelid four months before presenting himself for advice. It had increased in size gradually, and resembled a chalazion in many respects. The growth was adherent to the overlying skin, but freely movable over the tarsus. It was easily dissected out, and proved to be an encapsulated, non-pigmented, spindle-celled sarcoma made up of several lobules.

A review of the literature discloses about fifty cases previously recorded.

VI.—Dr. F. BULLER, Montreal. **An instrument intended to facilitate the operation of capsulotomy.** Two needles were set in an ordinary handle, exactly parallel with each other, not more than 0.25 *mm* in diameter and quite sharp. The method of operation is as follows: After dilatation of the pupil a careful inspection is made to disclose the weakest and the strongest parts of the capsule to be divided, bearing in mind that the aperture to be made must be as nearly as possible central. The double needle is passed through the cornea at any convenient point to the denser portion of the capsule, and the Knapp needle-knife passed through the sclero-corneal junction to the line of its first incision through the thinnest part. The second incision is then made by passing the cutting needle between the limbs of the double needle and cutting the denser capsule at one sweep. The double needle is to be withdrawn first and then the cutting needle.

Discussion.—Dr. STANDISH said that he had not seen this needle before, but some years ago had used the double needle quite frequently, but had found considerable difficulty in cutting the capsule without pushing it in before the instrument, and had consequently abandoned the method.

Dr. BULLER replied that he did not attempt to cut the capsule with the double needle, but merely exerted enough pressure to steady the capsule for incision with the needle-knife.

VII.—Dr. R. W. RANDOLPH, Baltimore. **A case of expulsive intra-ocular hemorrhage after preliminary iridectomy for cataract.** The patient, a woman of seventy-six, had

a mature cataract in the right eye and marked striæ of the lens in the left eye. She seemed in excellent health, and there was no reason why extraction should not be done. As she would not consent to enter the hospital, it was decided to operate at home, doing a preliminary iridectomy. This part of the operation was perfectly smooth, and the next day when the bandage was removed, everything was all right, the coloboma was clean and there was scarcely a trace of redness. On the morning of the third day, he was sent for because the patient had suffered severe pain during the night. He found the anterior chamber almost obliterated, the lens pressed forward so that the iris was pushed against the posterior surface of the cornea and the upper edge of the lens was close to the corneal wound. Cold compresses were applied, but as the eye looked worse the next day, extraction was attempted. The lens popped out with force, and was immediately followed by a mass of vitreous stained a deep red. The result was a shrunken eyeball.

Six months after this, glaucoma appeared in the left eye and in spite of non-operative treatment went on to blindness in nine months. Paracentesis of the vitreous was performed for the relief of pain and was quite successful. Dr. Randolph thinks, in view of the action of the left eye, that there probably existed a glaucomatous condition of less advanced stage in the right eye at the time of the iridectomy.

Discussion.—Dr. FRYER said he had met with several cases of hemorrhage after extraction. He considered this case especially interesting because the hemorrhage followed the very slight change of pressure produced by an iridectomy, and illustrates how little change may be necessary to produce hemorrhage in an eye that is predisposed thereto.

Dr. SUTPHEN reported a case of hemorrhagic glaucoma upon which he had attempted an iridectomy, but had a profuse loss of vitreous with destruction of the eye.

Dr. CARMALT asked if there had been any examination of the kidneys in this case, and both Drs. Randolph and Fryer replied that they had examined the urine in such cases with negative results.

Dr. MILLIKIN reported a case of hemorrhage occurring on the sixth day after extraction in which no serious results followed because the hemorrhage gradually cleared up.

Dr. REEVE said he had operated upon the second eye successfully, after the loss of the first by hemorrhage, and did it by first

performing a paracentesis, then an iridectomy, and, lastly, an extraction.

Dr. WADSWORTH reported one case of such profuse hemorrhage following an iridectomy that he was compelled to abandon the operation of extraction which he had intended.

VIII.—Dr. CHAS. STEDMAN BULL, New York. **Retinitis albuminurica as a factor in secondary glaucoma.** The connection between retinal hemorrhage and secondary glaucoma is recognized by all, but the connection between retinal albuminurica and secondary glaucoma does not seem to be so clearly recognised. The connecting link is probably more or less extensive disease of the walls of the blood vessels, which may be regarded as a common cause of both the retinitis and the hemorrhages. It is generally conceded that interstitial nephritis is the variety usually accompanied by retinal hemorrhages, and in this form of nephritis the general constitutional symptoms vary greatly in different cases. Albuminuria, the most certain sign, is occasionally absent, and when present is slight in amount and not easily detected. Two symptoms are rarely absent, however, and these are cardiac hypertrophy, with a doubling of the first sound, and certain cerebral phenomena. The most frequent head symptom is a continuous frontal or occipital headache. When these symptoms are found the urine should be subjected to frequent analysis.

In looking over the literature of hemorrhagic glaucoma he finds that many of the published cases were marked by these symptoms. In almost all the cases of secondary glaucoma preceded or accompanied by retinal hemorrhages and exudation it is quite impossible to decide whether the glaucoma is really secondary to the hemorrhages or whether the two are simply associated.

Dr. BULL then reported in detail four cases of acute glaucoma following exudative retinitis albuminurica.

Discussion.—Dr. PROUT suggested that possibly we could gain some knowledge of the cause of glaucoma if we could follow up a number of cases and see what the patients eventually die of.

Dr. WADSWORTH reported one case of secondary glaucoma in both eyes, in which he had been able to follow the patient's history until she died of acute pneumonia, but at no previous time had she been a subject of any discoverable disease.

Dr. HOWE brought up the question of heredity as a factor in the causation of glaucoma, and reported one family with eight cases of secondary glaucoma in three generations.

Dr. MITTENDORF said concerning heredity that the Hebrew population was especially prone to this disease.

IX.—Dr. A. ALT, St. Louis. **Anomalies in the epithelium of the crystalline lens and anterior polar cataract.** The author believes that contact between the anterior capsule and the posterior surface of the cornea, whether this part be otherwise healthy or infiltrated with pus, even if it be prolonged, cannot alone be the cause of the formation of an anterior polar cataract; that if it was it should occur now and then after a perforating injury of the cornea and with more frequency after ulcerative perforations of this membrane.

As to the cases of congenital nature, he was not inclined either to accept the theory of intra-uterine corneal perforation as an explanation, because in so many cases heredity seems to be an important factor.

He had studied microscopically a number of cases and believed that the prime cause of the formation of an anterior polar cataract is some congenital malformation of the lens, and that this is represented by a break in the continuity of the capsular epithelial layer as well as a dissolution of the contact between this layer and the lens capsule. With such an anomaly the capsule would be in much the same condition as Descemet's membrane after a loss of continuity in its endothelial lining, and this would permit of the penetration of substances into the lens which might be followed by the formation of cataract.

X.—Dr. W. B. JOHNSON, Paterson, N. J. **A method of converting the alternating current for use in connection with the Johnson magnet.** The magnet devised by Dr. Johnson and described in the May number of these ARCHIVES is of use only with a direct current of 110 or 120 volts, and as the street-lighting current in many cities is of the alternating variety it is essential that some means be used to convert it into a direct current in order to adapt it for use with this magnet. The method suggested is as follows: A $\frac{1}{4}$-horse-power fan motor for the alternating current is fitted with a pulley which is to be belted at a distance of three feet to a $\frac{1}{6}$-horse-power fan motor made for the direct Edison current; the speed of the motors to be the same. The Edison motor by changing the leads acts as a generator and furnishes the $\frac{1}{2}$-ampere of current at 110 volts necessary fully to saturate the core of the magnet.

XI.—Dr. W. B. JOHNSON, Paterson. **Report of three cases**

of magnet extraction of steel from the eyeball, through the point of entrance.

CASE 1.—A laborer, age twenty-six, was struck in the eye by a piece of steel. Examination made one hour later disclosed a perforating wound in the ciliary region on the nasal side about two lines in length. Extensive intra-ocular hemorrhage prevented a view of the fundus. Tension minus. The ovoid tip of the magnet held near the wound produced pain which increased as the eye was approached, but after several efforts the foreign body became engaged in the wound; was removed by forceps and measured $\frac{3}{16}$ inch long and $\frac{1}{8}$ inch wide and $\frac{1}{32}$ inch thick. Ten days later the eyeball had resumed a normal appearance with a vision of $\frac{20}{40}$.

CASE 2.—A machinist applied for treatment, stating that four days previous while chipping cast iron he was struck in the right eye by a piece of flying metal, and he had been told that the eye was cut and advised to have it enucleated. There was marked proptosis, conjunctival chemosis, and a penetrating horizontal wound in the lower part of the cornea. The corneal wound seemed to be partially closed and the general appearance suggested panophthalmitis. The ovoid tip of the magnet approached to the eye caused sharp pain, but soon the edge of the iron could be seen, and it was evidently too large to pass through the partially closed aperture. The wound was enlarged and on again approaching the magnet the piece of iron jumped out. It measured $\frac{1}{4}$ inch long, $\frac{3}{16}$ inch broad and $\frac{1}{16}$ inch thick. Prompt recovery took place, and at present he has distinct shadow perception.

CASE 3.—Blacksmith. While holding a hammer, which was being struck with a sledge, he was struck in the right eye by a piece of flying steel which he thought had entered the globe. On examination four hours later there was slight sinking of the eyeball, a vertical corneal wound extending from the centre upwards past the limbus, the iris was torn and prolapsed, the lens capsule ruptured, and the steel could not be seen. It was, however, easily removed by the magnet and measured $\frac{3}{8}$ of an inch long by $\frac{1}{8}$ inch thick. Recovery took place slowly, but the indications are favorable for the preservation of the ball.

Discussion.—Dr. HOWE said that with some magnets he had experienced this difficulty, that when the foreign body was drawn up to the wound it was scraped off in the effort to withdraw it.

Dr. HOLT answered that he had overcome this difficulty by

having an assistant separate the edges of the wound with a small Stevens's strabismus hook.

Dr. HARLAN spoke of the necessity of attempting the removal of foreign bodies as soon as possible after the injury and before they could be bound by exudative material.

XII.—Dr. J. O. TANSLEY, New York. **A cyst of the vitreous.** The patient came for advice saying that the sight in the right eye had been defective for about a year. There was no pain and no discomfort. V. equal $\frac{20}{100}$ and with $+\frac{1}{48}$ was $\frac{20}{70}$. There was a very pretty picture of a floating body in the vitreous, spheroidal in shape and about the diameter of the optic disc. When the eye was quiet it settled to the lower portion of the chamber and remained there in contact with the retina, but any movement of the eyeball caused it to jump about with great rapidity. The vitreous appeared to be fluid, and one could look through the transparent anterior capsule and contents of the cyst to see pigment spots on its posterior capsule. It seemed to be of a benign nature.

Discussion.—Dr. ALT suggested that this cyst might be an adenomatous tumor detached from the ciliary processes and undergoing mucoid degeneration.

Dr. RANDALL thought it more likely a detached cyst, such as those occasionally seen at the edges of a coloboma, and that it had been set adrift by a process of closure of the congenital cleft.

XIII.—Dr. A. ALT, St. Louis. **A case of sympathetic ophthalmia, due to glioma retinæ in the fellow eye.** The patient, a child of five years, had one year previously had the left eye removed because it was blind and a source of irritation to the right eye. There were well marked symptoms of sympathetic ophthalmia with blindness in the right eye, but in the course of eight months it improved under treatment by mercurials and iodides so that he could count figures at eight feet. In a short time two small growths appeared in the left orbit. Examination of these as well as of the enucleated globe, which was obtained, showed in both gliomatous tissue.

XIV.—Dr. B. L. MILLIKIN, Cleveland. **A case of spontaneous rupture of the eyeball.** The patient, a woman aged sixty-eight years, had for some time suffered from severe neuralgic pains in the head. There was rapid loss of vision, and she has been blind since '96. Both eyes were stony hard. On January 4, 1898, while sitting quietly in her own room she had an attack

of pain in one eye, followed immediately by profuse hemorrhage, the blood flowing freely down her face. Examination showed a rupture nearly vertical through the centre of the cornea from the lower margin of the pupil upward into the sclera. It seems to have been a spontaneous rupture of the weakened walls due to the extreme tension.

Adjournment.

Afternoon Session.

XV.—Dr. W. F. MITTENDORF, New York. **Multiple rupture of sphincter of the iris, with subsequent development of myopic astigmatism.**

The man was accidentally struck in the eye by a stone, and, as a result of the injury, had six distinct ruptures of the pupillary border. After these had healed, a refraction examination disclosed a myopic astigmatism of 3 D, with the axis of the cylinder in the direction of the most pronounced rupture. Previous to the injury the eye had seemed to be normal, and at the time of the examination the Javal ophthalmometer showed a normal cornea, so that the astigmatism must have been lenticular.

XVI.—Dr. LUCIEN HOWE, Buffalo. **Normal pupillary reaction, with microscope for its measurement.**

In all measurements of the pupil there are, of course, two factors in the problem: the pupil itself and the instrument with which it is measured. The variations of the former and the imperfections of the latter constitute the difficulties of the problem. The absolute size of the pupil is of comparatively little importance, ranging from an average of 4 *mm* in early life to about 3.5 *mm* in later life. Concerning the causes which produce changes in the size of the pupils, these are: first, intensity of light; second, accommodative effort; and, third, respiration and circulation. A fourth element, the psychic, may also play an important part. The best form of instrument for measuring the pupil is that in which the scale is fixed in the tube of a microscope or a telescope. The one exhibited gives a great amplification with a flat field, and the slightest variation in size can be easily detected and measured.

XVII.—Dr. R. L. RANDOLPH, Baltimore. **The value of acoin as a local anæsthetic in eye surgery.**

Dr. RANDOLPH referred to Trolldenier's recent report of experiments upon rabbits with acoin, the new anæsthetic, and reported upon his own use of it in the human eye. He had tried

it for the removal of foreign bodies, pterygii, tarsal tumors, etc., but did not find it in some respects as satisfactory as either cocaine or holocain. In those cases where there was much congestion, repeated installations were necessary to make the removal of a foreign body possible. The stinging sensation following its application was greater and its anæsthetic action slower always than is the case with either cocaine or holocain. A few bacteriological experiments seemed to show that it would destroy organisms after a short length of time, something under twenty-four hours.

XVIII.—Dr. C. H. WILLIAMS, Boston. **More uniform tests for vision, color sense, and hearing.**

In re-arranging the tests for one of the New England railroads, Dr. WILLIAMS found it necessary to have a new set of letters carefully drawn, so that the height of each letter should subtend the standard visual angle of five minutes, and the width of its component parts an angle of one minute. In order that these cards should be in portable shape, the letters were printed on cards three and a half by nine inches, and can be readily placed in an envelope and carried in the coat pocket. One line of letters only is printed on each card, and a different arrangement of letters for each of the required distances of twenty, thirty, or more feet, in order to prevent memorizing. Three cards contained printed representations of the ordinary semaphore arm signals, the length and width of the arms being the same as the height and width of the letters on the twenty-foot card, and when seen at a distance of twenty feet they correspond in size to the standard semaphore arm when seen at a distance of half a mile.

In regard to the color sense, Dr. WILLIAMS stated, as a general proposition, that no test for color perception is satisfactory unless it includes first a test by comparison of colors, the Holmgren worsted test being perhaps the best, and, second, a test with colored lights, in which the intensity of the lights can be varied and in which the names of the colors should be given by the person examined. Dr. WILLIAMS exhibited a lantern which he had devised for making this test for colored lights. It renders it possible to detect a very small central color defect which would not be noticed when testing with the worsteds, because their image would cover a larger area than that affected.

In order to give a more uniform test for hearing, a ratchet acoumeter was presented, which produces a series of sharp metallic sounds by simply turning the milled screw-head.

Concerning the use of spectacles by railroad employes, he says that there can be no objection to their use for reading train orders, etc., but for distant vision, and under all the varying conditions of weather, it will be found that when the need of assistance from the glass is greatest they will often be a hindrance rather than a help. The moisture condensing on the glass will obscure the vision, and the tendency will be to remove them and depend upon unaided sight.

XIX.—Dr. C. H. WILLIAMS. **A modified perimeter.**

This consists of the ordinary self-registering perimeter, with electrical attachments. A small incandescent light of ½-candle-power is used for fixation, and another is so attached to the movable arc, that it can, by pressing the button, be moved along this arc. The amount of light can be regulated by means of ground glass globes, and colored globes may be used for testing the color field.

Adjournment.

BOOK NOTICES.

(Continued from p. 376.)

XXVII. **Progressive Medicine, Vol. II.**—A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. Octavo, handsomely bound in cloth, 472 pages, 56 illustrations, and 3 full-page plates. Lea Brothers & Co., Philadelphia and New York.

This volume, issued in June, 1899, contains, besides three other articles, one of 90 pages on ophthalmology, by Jackson. Instead of giving, as in the ordinary annual, the title and a disconnected, undigested abstract of every paper published, no matter how unimportant or misleading, the author here under each caption discusses from an intelligent personal point of view such recent contributions to the subject in hand as seem to him to be of actual importance. The result is a readable and judicious commentary on the recent progress of ophthalmology, the perusal of which will enable one with the least expenditure of energy to bring his ophthalmological information up to date. W. A. H.

XXVIII. **Die Sehleistungen von 50,000 Breslauer Schulkindern** (The Acuteness of Vision of 50,000 Breslau School-Children). Von Prof. HERMANN COHN, Breslau. 8vo, pp. 148. Schottlaender, 1899.

The very explicit directions given in this work for the guidance of those who may wish to carry on investigations regarding the vision of children and the changes incident to school life, deserve careful study on the part of such, for they have been formulated by a most experienced investigator. The results of the ocular hygiene which has been adopted in the schools of Breslau since he began his labors are surprising. He states that in 1865, when he exam-

ined 10,060 of the school-children of Breslau, 18.8 % of the boys and 14.3 % of the girls had some abnormality of the eyes, while in 1898 this was true only of 12.9 % of the boys and 12.8 % of the girls. As he says: "It would be the greatest triumph of ocular hygiene if a further decrease of ocular faults could be demonstrated from year to year."

A number of facts were elicited in the examination of this great number of children's eyes, and certain theoretical and practical deductions were made therefrom, some of which may be considered to be of major importance. The principal facts are as follows:

Nearly one half of the children could recognize in the open air a character supposed to be recognizable at not over 6 *m*, at distances varying from 7 to 12 *m*; over one third, 38 %, at from 13 to 18 *m*; 3 % at from 19 to 24 *m*; and 1 % at distances over 24 *m*, the greatest being 27 *m*. Recognition of this character at distances between 7 and 12 *m* was more common among the girls (55 % to 39 %), but between 13 and 18 *m* among the boys (56 % to 40 %). The 7 to 12 *m* vision was more common in the lower schools; the 13 to 18 *m* vision in the upper. The acuteness of vision of the healthy eye does not diminish in youth either from year to year or from lustrum to lustrum. The average vision is double that usually supposed. Vision less than normal was found in 9 % of the children of the lower schools, in 13 % of those in the middle, and in 17 % of the higher, the average being 10 %. Comparison of these figures with those obtained in 1865–66 shows that the number of school children with poor vision has been reduced one half in one generation, and that in the same time diseases of the eye have diminished 75 %.

It appears that a distinction should be made between vision measured in a room and vision measured in the open air, for of the 46,733 normal children the average distance at which a given character could be recognized was, in the open air, double what it was in a room.

It also appears that the angle half a minute is the smallest average visual angle, instead of 1′ as heretofore supposed; and that the smallest visual angle may be very much smaller, as 194 children read No. 6 at from 21 to 24 *m*—*i. e.*, with a visual angle of 15 seconds.

Signs of much painstaking work are evident throughout the book, which will repay careful reading. M. L. F.

MISCELLANEOUS NOTES.

PRIZE ESSAY.

The Alvarenga Prize of the College of Physicians of Philadelphia has been awarded to Dr. ROBERT L. RANDOLPH of Baltimore, for an essay entitled "The Degeneration of the Crystalline Lens. An Experimental Study."

Obituary.

ALFRED GRAEFE, cousin and pupil of Albrecht von Graefe, and Professor of Ophthalmology at Halle from 1867 to 1892, died at Weimar on April 19th at the age of sixty-eight. He was an active worker and a frequent contributor to ophthalmological journals, but his name, doubtless, will chiefly be remembered in connection with the *Handbuch der gesammten Augenheilkunde*, edited jointly with Saemisch, and with his own article on disturbances of mobility in that work. His last literary labor was the revision of this article for the new edition of the handbook now going through the press.

Contents of the last numbers of the Archiv für Augenheilkunde (German Edition of these ARCHIVES).

Vol. XXXIX., No. 1. Issued April, 1899.

1. AXENFELD and BUSCH (Rostock). A contribution to the symptomatology and histology of primary myxosarcoma of the optic nerve and on its operative removal by Krönlein's method.

2. SICHERER (Munich). Investigations on the sterilization of India ink for tattooing the cornea.

3. SCHULTZ (Berlin). Clinical contributions to purulent keratitis.

4. FUKALA (Vienna). Refraction among the ancients (translated).

5. WALTER (Odessa). Follicular conjunctivitis and trachoma (translated).

6. KIRIBUCHI (Tokyo). On Fuchs's peripheric atrophy of the optic nerve.

7. DUFOUR (Lausanne). On a subconjunctival angio-fibroma of the intrinsic muscles with hyaline degeneration.

8. WOLFF (Berlin). On the operation for securing the mobility of artificial eyes and its partial replacement by a new eye of peculiar form (translated).

9. ABELSDORFF (Berlin). Translation of the original articles of the English edition of these ARCHIVES (ARCH. OF OPHTH., xxviii., 1).

Systematic Report, 4th quarter, 1898, continued (translated).

Vol. XXXIX., No. 2. Issued June, 1899.

10. SCHWEIGGER (Berlin). On the technique of advancement in squint operations (translated).

11. A. H. KNAPP (New York). A case of chronic empyæma of the frontal and ethmoidal sinuses with exophthalmus; operation; recovery.

12. GELPKE (Karlsruhe). On homonymous hemianopsia of cortical origin, with peculiar disturbances in the remaining halves of the visual fields.

13. DOLGANOFF (St. Petersburg). On the pathological anatomy of glaucoma.

14. HOLDEN (New York). The pathology of experimental quinine amblyopia.

15. R. D. COHN (San Francisco). On herpes zoster ophthalmicus. A clinical study.

16. WILBRAND (Hamburg). On relaxed hysterical ptosis.

17. HOLMES (Cincinnati). Extirpation of the lachrymal sac and glands.

18. JAESCHE (Dorpat). On binocular vision.

CONTENTS OF VOLUME XXVIII., NUMBER 5.

PAGE

1. Eye Strain in its Relation to the Vertical Centration of Lenses. By **Burton L. Dunn**, B.S., M.D., Syracuse, N. Y. 487

2. Some Aids in Ophthalmic Teaching. By Prof. **F. Dimmer**, Innsbruck. Translated by Dr. MATTHIAS LANCKTON FOSTER, New York. (With six figures in the text) 494

3. The Question as to the Presence of Ganglion Cells in the Iris. By Dr. **N. Andogsky**, St. Petersburg. Translated by Dr. WARD A. HOLDEN. (With seven figures on Plates III.–IV. of Vol. XXXIV., German Edition) 510

4. Suppurative Keratitis. By Dr. **A. Schultze**, Berlin. Translated by Dr. MATTHIAS LANCKTON FOSTER, New York 516

5. On the Changes in the Eye after Ligation of the Gall Bladder (an Experimental Contribution to the Knowledge of Ophthalmia Hepatica). By Dr. **W. Dolganoff**, St. Petersburg. Abridged Translation by Dr. WARD A. HOLDEN. (With fourteen figures on Plates XI.–XII. of Vol. XXXIV., German Edition) . . 533

6. A Contribution to the Subject of Tuberculosis of the Conjunctiva. By Dr. **Carl Grunert**, Tübingen. Abridged Translation by Dr. WARD A. HOLDEN 540

7. Experiences and Studies with Regard to Strabismus. By Dr. **Ph. Steffan**, Frankfort-on-the-Main. Translated by Dr. MATTHIAS LANCKTON FOSTER, New York 547

8. Abstract of the Papers in Vol. XXXIII. (1896) of the German Edition of these ARCHIVES not Previously Translated. By Dr. **Colman W. Cutler** 564

   I.—Antisepsis or Asepsis in Operations on the Eyeball. A Comparative Bacteriological Study. By Dr. Ludwig Bach, Wurzburg, 564.

   II.—Concerning the Danger of Infection in Different Operations on the Eye, and the Conditions Affecting the Progress of Suppuration from its Anterior to its Deeper Portions. By Dr. N. Andogsky, St. Petersburg, 565.

   IV.—The Amblyopia Associated with Strabismus. By Dr. Guillery, Cologne, 567.

PAGE

V.—Is Intermarriage a Factor in the Causation of Pernicious Myopia? By Dr. Julius Wolff, Cologne, 568.

VI.—Report of 295 Cataract Operations in Prof. Schöler's Clinic, Berlin. By Dr. Walter Albrand, Berlin, 568.

VII.—A Case of Paralysis of the Trigeminus. By Dr. J. K. A. Wertheim Salomonson and Dr. C. H. A. Westhoff, Amsterdam, 569.

XI.—Analysis of the Process of Touching Objects Looked at. By Dr. Moritz Sachs, Vienna, 571.

XII.—Advancement of the Levator Palpebræ Superioris with Division of its Insertion. Two New Methods in Congenital Ptosis. By Dr. Hugo Wolff, Berlin, 575.

XVI.—Statistical Contribution to the Study of Congenital Amblyopia. By Dr. M. Straub, Amsterdam, 576.

XVIII.—Investigations as to the Occurrence of Striated Opacities of the Cornea. By Prof. Hess, Leipsic, 578.

XIX.—Notes on Changes in Neuroglia Cells in Inflamed and Degenerated Optic Nerves. By Dr. Richard Greeff, Berlin, 579.

XX.—The Etiology of Pseudo-Membranous Conjunctivitis. By Dr. Fritz Schanz, Dresden, 581.

XXVII.—The Transplantation of Bridge-shaped Conjunctival Flaps for the Protection of Large Corneal Defects with Prolapse of the Iris. By Prof. Leopold Weiss, Heidelberg, 581.

XXIX.—The Prophylaxis of Sympathetic Ophthalmia. By Dr. George Abelsdorff, Berlin, 587.

9. Systematic Report on the Progress of Ophthalmology in the First Quarter of the Year 1899. By Dr. **St. Bernheimer,** in Vienna, Dr. **O. Brecht,** Prof. **R. Greeff,** Prof. **C. Horstmann,** and Prof. **P. Silex,** in Berlin. With the assistance of Dr. G. Abelsdorff, Berlin; Dr. Swan M. Burnett, Washington; Dr. Dalén, Stockholm; Dr. Herrnheiser, Prague; Prof. Hirschmann, Charkow; Dr. Krahnstöver, Rome; Dr. P. von Mittelstädt, Metz; Prof. Da Gama Pinto, Lisbon; Dr. Richard Schweigger, Berlin; Dr. Sulzer, Paris; Dr. L. Werner, Dublin; Dr. C. H. A. Westhoff, Amsterdam; and others. Translated by Dr. WARD A. HOLDEN 588

A.—Dr. SCHWEIGGER. Cornea, sclera, and anterior chamber, 588.

B.—Dr. O. BRECHT. Lens, 591; Choroid, 595; Vitreous, 597; Glaucoma, 598; Sympathetic ophthalmia, 599.

C.—Prof. GREEFF. Retina and functional disturbances, 600; Optic nerve, 604; Injuries, foreign bodies, and parasites, 605; Ocular disturbances in general diseases, 606.

10. Book Notices 609

XXIX.—Die Verletzungen des Auges. By Dr. E. Praun.

XXX.—Beitrag zur Casuistik des Exophthalmus pulsans. By Dr. Emil Keller.